Engineering

BIBLIOGRAPHY OF Technical Reports

Contents

January 16, 1953
Vol. 19, No. 1

Apparel 1
Chemical and Allied Products 1
Drugs and Pharmaceuticals 5
Dyes; Detergents 6
Agricultural Chemicals 6
Plastics and Plasticizers 7
Chemical Engineering 7
Miscellaneous Chemicals 9
Electrical Machinery 9
Communication Equipment 10
Electronics 11
Generators, Motors 12
Food and Kindred Products 13
Fuels and Lubricants 14
Highways and Bridges 14
Instruments 17
Machinery 17
Medical Research and Practice 17
Metals and Metal Products 20
Meteorology and Climatology 21
Minerals and Mineral Products 22
Ordnance and Accessories 23
Packing and Packaging 23
Personnel Aptitude Testing 24
Photographic and Optical Goods 25
Physics 25
General 26
Nuclear 28
Psychology 29
Rubber and Rubber Products 29
Structural Engineering 29
Transportation Equipment 29
Aeronautics 29
Aircraft 31
Engines and Propellers 31
Aerodynamics 32
Marine Transportation 32
Water Supply 32
Miscellaneous 32

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES

HOW TO ORDER REPORTS

- Order by PB report number.
- Orders for reports available in **mimeographed** or printed form (identified as "mimeo") should be addressed to the U. S. Department of Commerce, Office of Technical Services, Washington 25, D. C. Check or money order must accompany order and be made payable to the **Treasurer of the United States.** For prompt service and convenience, use order blank A.
- Orders for reports in **microfilm** or **photostat** form should be addressed to the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C. Check or money order must accompany order and be made payable to the **Librarian of Congress.** Indicate for each item which type of reproduction is desired. For prompt service and convenience use order blank B.
- Orders for publications available from other sources should be addressed to the organization indicated. Do not use order blanks A or B and do not send orders to OTS or the Library of Congress.
- Foreign purchasers of reports, other than those in Canada, Cuba, and Mexico, should include an additional amount for postage according to the following scales:

  Printed, mimeographed, and photostated reports: Approximately 4 pages per ounce.

  Microfilm: Approximately 50 frames (one frame per page) per ounce.

  Rates vary for different countries. It is the purchaser's responsibility to compute postage.

The BIBLIOGRAPHY OF TECHNICAL REPORTS is issued monthly by the Office of Technical Services, U. S. Department of Commerce. Subscription: $5 per year. Foreign subscribers, other than those in Canada, Cuba, and Mexico, are requested to remit $3 additional for foreign postage. Individual copies 50 cents. Use order blank A.

The PB reports listed in the BIBLIOGRAPHY have been received from civil and military agencies of the United States Government and from cooperating foreign governments. Security restrictions have been lifted on all reports listed. PB is the abbreviation for Publication Board, which was established to select and publicize these reports. For further information, see inside back cover.

Items of special interest to smaller business firms are abstracted in the monthly TECHNICAL REPORTS NEWSLETTER, available from OTS at 50 cents a year.

The Office of Technical Services is responsible, under Public Law 776, 81st Congress, for aiding in the collection and dissemination of technical reports of benefit to American science and industry. Except to the extent indicated by acknowledgment of authorship, the Office does not edit reports, nor does it accept responsibility for information and opinions contained in them. Patents may cover the subject matter of any report; the reader is advised to make suitable patent searches before developing applications based on the reports.

Contents of this publication are not copyrighted and may be reprinted freely. Mention of source will be appreciated.

Published with the approval of the Director, Bureau of the Budget, September 29, 1952

U. S. DEPARTMENT OF COMMERCE
Charles Sawyer, Secretary

OFFICE OF TECHNICAL SERVICES
John C. Green, Director

Comm-DC 15796

Form TS-37
(12-29-52)
A5.57

ORDER BLANK (A)

For Use by OTS		
Quantity		Amount
	Enclosed	$
	To be mailed later	
	Subscriptions	
	Refund	
Date of this order		

TO: U. S. Department of Commerce
Office of Technical Services
Washington 25, D.C.

Ship Order To *(Name, Street Address, City, Zone, State)*

Quantity Desired	Number and Title of Publication	Unit Price	Total Price
	Subscription to Bibliography of Technical Reports	$5.00	
	PB 106461 Final report of the council.	$ .90	
	PB 106640r Current status of the shell-mold.	$ .25	
	PB 111026 Bibliography of motion pictures and film strips on materials handling.	$ .50	
	PB 111059 Melting and refining of secondary brass and bronze alloys.	$ .25	
	PB 111070 Laundry science abstracts.	$1.50	
	PB 111071 Insulation of risers for ferrous castings.	$ .50	
	PB 111072 Television recording project.	$1.00	

NOTICE: PREPAYMENT IS REQUIRED. Check or money order accompanying this order should be made payable to the Treasurer of the United States.

Quantity Desired	Number and Title of Publication	Unit Price	Total Price

NOTICE: PREPAYMENT IS REQUIRED. Check or money order accompanying this order should be made payable to the Treasurer of the United States.

Form TS-38
(12-29-52)
A5.58

ORDER BLANK (B)

This space for use by Library of Congress

TO: Library of Congress, Photoduplication Service
Publication Board Project
Washington 25, D.C.

Ship
Order To
(Name,
Street
Address,
City,
Zone,
State)

Date of this order

NOTE - Microfilm requires special reading equipment. It cannot be read with the naked eye.

Quantity Desired	PB Number and Title of Publication	Type of Reproduction	Unit Price	Total Price
			$	$

NOTICE: PREPAYMENT IS REQUIRED. Check or money order accompanying this order should be made payable to the Librarian of Congress.

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

BIBLIOGRAPHY OF Technical Reports

January 16, 1953 Vol. 19, No. 1

APPAREL

Wet cold and dry cold weather uniforms: Standard components and authorized substitutions. U. S. Army. Sep 1951. 20p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107729

1. Uniforms, Military 2. Clothing, Cold weather 3. WD TB 10-275-2.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Effects of certain motion sickness preventives upon psychological efficiency, by Robert B. Payne, Edwin W. Moore, and James L. Bethurum. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1952. 25p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107771

The effects of selected drugs (hyoscine, dramamine, benadryl, and benadryl-hyoscine) upon a wide variety of psychological processes are systematically explored by standardized testing techniques. The drugs differ widely from one another in magnitude of effects produced, but they uniformly impair implicit processes more than explicit processes. The results are discussed in relation to various aircrew duties. AAF SAM Proj. no. 21-32-019, Report no. 1.

Limiting effect of adrenaline on the output of the adrenal medulla, by Ellen Eva King and Amedeo S. Marrazzi. U. S. Chemical Corps. Medical Laboratories, Army Chemical Center, Md. Aug 1952. 25p drawing, diagrs, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107943

Projects no. 4-08-02-010 and 4-08-02-012.
1. Adrenalin - Physiological effects 2. Adrenals - Effects of adrenalin 3. Injections, Saline - Effect on blood flow 4. CC MD RR 130.

Pharmaceuticals and other organic preparations. I. G. Farbenindustrie A. G. 1928-1945. 1151f Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $9.00, Enlargement Print $151.25. PB 74676

This FIAT microfilm reel contains directions for producing numerous pharmaceuticals and their intermediates; also some directions for producing plant protective agents, reports on meetings, abstracts of lectures, statistical data, and testing directions of pharmaceuticals. Individual items, consisting of individual items or, in some cases, groups of related items, are listed below. They may be obtained as enlargement prints; please give PB and frame numbers when ordering. FIAT Microfilm Reel L 7, Frames 650-1800.

Frames	Title	Price
650-665	Process for producing acetoacetic ester. 1940.	$3.75
666-668	Process for producing oxalacetic ester sodium. 1940.	$2.50
669-677	Process for producing phenylhydrazine. 1940.	$2.50
678-683	Process for producing 1-phenyl-3-methyl-5-pyrazolone. 1939.	$2.50
684-689	Process for producing benzenesulfochloride and benzenesulfamide. 1939.	$2.50
690-695	Process for producing "p-Tolylmethylpyrazolon." 1940	$2.50
696	Uninformative file note.	$1.50

Frames	Title	Price
697-702	Process for producing acetyl-salicylic acid. 1940.	$2.50
703-704	Process for producing p-aminobenzoyl-dimethylamino-ethanol. 1939.	$1.50
705-709	Process for producing anesthesine (ethyl-p-amino-benzoate). 1939-1943.	$1.50
710-712	Directions for producing diethyl-amino-ethanol. 1939-1944.	$1.50
713	Directions for producing dimethyl-amino-ethanol. 1944.	$1.50
714-716	Directions for producing "Novolsalz", diethylamino-ethanol hydrochloride. 1939-1944.	$1.50
717-728	Directions for producing novocaine. 1939-1944.	$3.75
729	Directions for producing "Curtacian". 1939.	$1.50
730-734	Directions for producing Pantocaine. 1940.	$1.50
735-738	Directions for producing ethyl-p-nitrobenzoate. 1939-1943.	$1.50
739-754	Directions for producing antipyrine and antipyrine salicylate. 1939-1946.	$3.75
755-757	Directions for producing amino-antipyrine. 1939.	$1.50
758	Directions for producing "Arantil" intermediate. 1939.	$1.50
759-761	Directions for producing benzal-amino-antiyprine. 1939.	$1.50
762-763	Directions for producing methyl-bromide and its mixtures with ethylene bromide. 1939.	$1.50
765-766	Directions for producing 6-acetamido-4-hydroxy-quinaldine. 1939.	$1.50
767	Directions for producing "Gardan". 1939.	$1.50
768-771	Directions for producing Melubrin. 1939-1945.	$1.50
772-775	Directions for producing methyl-amino-antipyrine. 1939.	$1.50
776-782	Directions for producing Novalgin. 1939.	$2.50
783-794	Directions for producing Pyramidon. 1939.	$3.75

Frames	Title	Price
795	Directions for producing acetone bisulfite. 1939.	$1.50
796	Directions for producing chloretone. 1939.	$1.50
797	Directions for producing acetyl-choline chloride. 1939.	$1.50
798	Directions for producing Arterenol. 1940.	$1.50
799	A correction concerning "Aspasan." 1943.	$1.50
800-801	Improved directions for producing piperidinopropane. 1943.	$1.50
802	Directions for producing benzyl-amine. 1939.	$1.50
803	Directions for producing benzyl-ephedrine. 1940.	$1.50
804	Directions for producing benzyl-methylamine. 1939.	$1.50
805-808	Directions for producing Surfen C="Congasin." 1940.	$1.50
809	Directions for producing cinnamyl-chloride and cinnamyl ephedrine. 1939.	$1.50
810-812	Directions for producing 3,4-dihydroxy-ephedrine. 1943.	$1.50
813-816	Directions for producing 3,4-dihydroxy-propiophenone and 3,4-di-benzyl-hydroxy isonitrosopropiophenone. 1939.	$1.50
817	Directions for producing racemic corbasil hydrochloride. 1939.	$1.50
818	Directions for producing 1-corbasil. 1939.	$1.50
819-824	Directions for producing Veratrol and "Entozon." 1940.	$2.50
825	Directions for producing 3-methyl-6-methoxy-benzyl-ephedrine. 1939.	$1.50
826-828	Directions for producing m-hydroxy-norephedrine hydrochloride. 1939.	$1.50
829	Directions for producing racemic ephedrine hydrochloride. 1939.	$1.50
830-834	Directions for producing Rivanol. 1939.	$1.50
835-838	Directions for producing racemic Suprarenin. 1939.	$1.50

Frames	Title	Price
839-842	Directions for producing "Suprifen." 1940.	$1.50
843-848	Directions for producing "Surfen A." 1939-1940.	$2.50
849	Directions for producing benzylephedrine. 1939.	$1.50
850-852	Directions for producing "Varon." 1943.	$1.50
853-860	Directions for producing Atebrin. 1941.	$2.50
861-862	Directions for producing Ninhydrin. 1943.	$1.50
863-865	Directions for producing n-butylchloride. 1943.	$1.50
866	Directions for producing "Allegan." 1939.	$1.50
867	Directions for producing p-aminobenzoic acid. 1939.	$1.50
868-869	Directions for producing Arsacetin. 1939.	$1.50
870	Directions for producing (sodium) arsanilate. 1939.	$1.50
871-874	p-Aminophenylarsonic acid (arsanilic acid). 1939.	$1.50
875-876	Gold preparation for "Aurophos" (auro-sodium thiosulfate). 1939.	$1.50
877-879	Directions for producing casbis and casbis emulsion. 1939.	$1.50
880-882	Directions for producing "Cialit." 1939.	$1.50
883	Directions for producing "Ebesal." 1945.	$1.50
884-886A	Directions for producing "Cuprion." 1939.	$1.50
887-905	Directions for producing Salvarsan and intermediates. 1939.	$3.75
906-911A	Salyrgan-Theocin and intermediates. 1939.	$2.50
912-913	Neosilversalvarsan. 1939.	$1.50
914	Directions for producing Spirocid. 1939.	$1.50
915-921	Directions for producing "Solusalvarsan." 1939.	$2.50
922-926	Directions for producing 2-hydroxy-4-acetamidophenylarsinic acid ("Acetylfourneausäure") and intermediate. 1939.	$1.50
927	Directions for producing "Solvarsin-Spirocid." 1939.	$1.50
928-931	Directions for producing "Sulfoxylsalvarsan." 1939.	$1.50
932-934	Directions for producing Triphal and intermediates.	$1.50
935-937	Directions for producing p-nitro- and p-chloro-phenylarsinic acid. 1942.	$1.50
938	Directions for producing camphenilanic acid. 1940.	$1.50
939	Directions for producing "Flavadin" solution. 1939.	$1.50
940-943	Directions for producing Lopion and intermediates. 1939.	$1.50
944-945	Directions for producing "Myosalvarsan" (Myoarsphenamine). 1939.	$1.50
946-948	Directions for producing "Neoolesal" = bismuth camphenilanate. 1939.	$1.50
949-954	Directions for producing Neosalvarsan. 1939.	$2.50
955-957	Directions for producing "Parmanil." 1939.	$1.50
958-959	Directions for producing phenylarsinic acid. 1939.	$1.50
960-961	List of hormone preparations Names only.	$1.50
962-963	Directions for producing "Iliron" (adrenal cortex preparation). 1939.	$1.50
964-965	Directions for producing Hypophysin. 1939.	$1.50
966-969	Directions for producing "Hemodal." 1943.	$1.50
970-971	Directions for producing Gultathion. 1939.	$1.50
972	Directions for producing "Eviabit" (wheat germ oil). 1939.	$1.50
973	Preliminary directions for producing ferment preparation from pancreas residue. 1943.	$1.50
974-975	Directions for producing "Erugon." 1939.	$1.50
976	Directions for producing vitamin E for "Ereton." n. d.	$1.50
977-979	Directions for producing "Elityran," "Invenol," and "Emanal." 1939.	$1.50

Frames	Title	Price
980	Directions for producing "Des 162." 1939.	$1.50
981-982	Directions for producing "Derrophen." 1939.	$1.50
983	Directions for producing "Cortenil" in oil. 1939.	$1.50
984-986	Directions for producing the "P-factor" for "Priovit." 1939.	$1.50
987-1015	Directions for producing insulin. 1939-1942.	$5.00
1016-1019	Directions for producing Lacarnol. 1939.	$1.50
1020-1027	Directions for producing progesterone and "Lutren." 1939.	$2.50
1028-1031	Directions for producing "Orasthin" and "Tonephin." 1939.	$1.50
1032	Directions for producing "Paragen." 1939.	$1.50
1033-1035	Directions for producing "Preloban." 1939.	$1.50
1036	Directions for producing dried testicle powder. 1939.	$1.50
1037	Directions for producing "Tonephin" snuff. 1939.	$1.50
1038-1043	Directions for producing "Torantil." 1939.	$2.50
1044-1046	Directions for producing "Bioferrin." 1939.	$1.50
1047	Directions for producing "Festal." 1939.	$1.50
1048-1053	Directions for producing Omnadin. 1939-1940.	$2.50
1054	Directions for producing "Omnoral." 1939.	$1.50
1055	Directions for producing partigens. 1939.	$1.50
1056	Directions for producing protein "L". 1939.	$1.50
1057-1058	Directions for producing "Typhoral" and other vaccines for peroral administration. 1939.	$1.50
1059	List of bacteriological products. 1939. Names only	$1.50
1060-1061	Directions for producing typhoid vaccines. 1939.	$1.50
1062-1064	Directions for producing tuberculins. 1939.	$1.50
1065	Directions for producing "Trichophytin." 1939.	$1.50
1066	Directions for producing "Staphar." 1939.	$1.50
1067-1068	Directions for producing swine plague vaccine and lymph. 1939.	$1.50
1069	Directions for producing hog paratyphoid vaccine. 1939.	$1.50
1070	Directions for producing blackleg vaccines. 1939.	$1.50
1071	Directions for producing pneumonia vaccine (for calves). 1939.	$1.50
1072	Directions for producing pasteurella vaccine. 1939.	$1.50
1073	Directions for producing mixed vaccine for treating colds. 1939.	$1.50
1074	Directions for producing "Ambiosin." 1939.	$1.50
1075	Directions for producing mixed vaccine for colt paralysis (Antibulin vaccine). 1939.	$1.50
1076	Directions for producing cholera vaccine. 1939.	$1.50
1077	Directions for producing druse vaccine. 1939.	$1.50
1078	Directions for producing Febris undulans vaccine. 1939.	$1.50
1079	Directions for producing chicken cholera vaccine. 1939.	$1.50
1080	Directions for producing vaccine against fowl diphtheria and fowl pox. 1939.	$1.50
1081	Directions for producing "Gonargin." 1939.	$1.50
1082	Directions for producing mixed gonococci vaccine. 1939.	$1.50
1083	Directions for producing mixed vaccine against influenza. 1939.	$1.50
1084	Directions for producing mixed vaccine against cold. 1939.	$1.50
1085-1086	Directions for producing vaccines against whooping cough. 1939.	$1.50
1087	Directions for producing "Leukogen" (staphylococci vaccine). 1939.	$1.50

Frames	Title	Price
1088	Suprerenin-Corbasil. 1939.	$1.50
1089-1095	Solutions of novocaine and other substances. 1939.	$2.50
1096	Amphotropin-camphor. 1939.	$1.50
1097	Novalgin=Melubrin. 1939.	$1.50
1098	Trypaflavin, Rivanol, and "Argoflavin." 1939.	$1.50
1099-1161	Directions for producing various tablets and powders. 1939.	$10.00
1162	"Bovoflavin" ointment. 1945. Not very legible.	$1.50
1163-1164	"Ciff" capsules. 1945. Not very legible.	$1.50
1165	"Devegan" tablets. 1945. Not very legible.	$1.50
1166	Directions for producing "Igitol" pills for cattle. 1945. Not very legible.	$1.50
1167	"Postonal." 1945. Not very legible.	$1.50
1168	Ointment base "D". 1945. Not very legible.	$1.50
1169-1196	Directions for producing plant protecting agents. 1939.	$5.00
1197-1201	Nicotine. 1932-1940.	$1.50
1202	Test for the suspendibility of "Aresin." 1940.	$1.50
1203-1212	List of the pharmaceuticals produced at I. G. plant Höchst in 1944.	$2.50
1213-1239	Penicillin. 1944. Includes travel and conference reports. Not very legible.	$3.75
1240-1246	Antibacterial properties of products of the metabolism of microorganisms and related synthetic products. 1944.	$2.50
1247-1248	Penicillin. 1944.	$1.50
1249-1250	Penicillium Marburg. 1943.	$1.50
1251-1252	Conference on corpus luteum. n.d. Not very legible.	$1.50
1253-1255	Ovarial extracts. 1937.	$1.50
1256-1258	Brief notes on various biological preparations. 1943.	$1.50
1259-1264	Abstracts of lectures of meeting on microbiology, Hanover. 1943.	$2.50
1265-1267	Extractions of lymphatic glands. 1938.	$1.50
1268-1277	Letters on and discussion of "RIO" (against tuberculosis). 1939-1942.	$2.50
1278-1279	"Alumnol" (2-naphthol-aluminum disulfonate). 1943.	$1.50
1280-1800	Directions for analyses and tests of numerous pharmaceuticals. 1934-1941.	$68.75

Rapid procedure for determining relative antibiotic sensitivity of microorganisms, by David E. Singer, Laurie V. Pierce, Elizabeth C. Yawn, A. V. Hardy and R. B. Mitchell. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Oct 1952. 14p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50.

PB 107725

A procedure is described for the rapid determination of antibiotic sensitivity of microorganisms to seven therapeutic agents-penicillin dihydrostreptomycin, neomycin, aureomycin, chloromycetin, terramycin, and sulfadiazine—on a single inoculated culture plate. This procedure gave results comparable to those obtained with the standard tube titration technic and those obtained by using various commercial disc preparations. The author discusses the comparative sensitivity reactions to seven therapeutic agents of 3,732 microorganisms isolated from urine, otitis externa, and miscellaneous exudate cultures. AAF SAM Proj. 21-35-006, Report no. 3.

Dyes

(Abstract) Dyes and textile chemistry reports. I. G. Farbenindustrie A. G., Höchst, Ger. 1934-1946. 6p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107753s

List of reports in PB 70249-70250, 70253-70257, 70358, 70361, 70377, 70150, 70160, 70168, 70180, 70183. For other reports see Micro BIOS FD 513/51 1. Dyes and dyeing - Germany 2. Textile chemistry - Germany 3. Micro BIOS FD 535/51, abstract.

Detergents

Laundry science abstracts, a literature survey prepared, by Francis D. Horigan. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Laboratories. Technical Library. Apr 1952. 54p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

PB 111070

These abstracts present significant developments in the field of laundry science as reflected in the published and patent literature for the years 1946-1951. The bibliography is arranged alphabetically according to author. Although not comprehensive in scope, it does present a good cross-section of the subject in both domestic and foreign fields. Author, subject, and patent indexes supplement the text. QMC TL BS 22.

Agricultural Chemicals

Examination of toxic agents for fungicidal coating-materials, part IV, by Wilson M. Whaley, W. L. Clark, W. E. Weaver and J. M. Leonard. U. S. Naval Research Laboratory. Aug 1945. 31p photos, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107863

Fifteen chemical compounds have been examined as components of fungicidal lacquers and varnishes. Acetoxymercurimesitylene and acetoxy-mercuri-o-phenylphenol gave good results and are now being further investigated for corrosiveness and durability. The need for coordinated work in this field has been emphasized. Parts I-III are NRL reports P2518, 2611, 2626. NRL P 2628.

Report of the Pest Infestation Research Board with the report of the Director of Pest Infestation Research for the year 1951. Gt. Brit. Dept. of Scientific and Industrial Research. Pest Infestation Research Board. Mar 1952. 45p photos, graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 107904

S. O. code no. 47-153-0-51.
1. Pest control - Gt. Brit. 2. Insecticides - Evaluation - Gt. Brit. 3. Fumigants - Gt. Brit. 4. DDT - Insecticides - Gt. Brit.

Plastics and Plasticizers

Amines as silicone catalysts, by N. Vasileff. Princeton University. Plastics Laboratory. Jul 1950. 9p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107828

A number of amines were examined to determine their catalytic action on the commercial silicone resins in an attempt to reduce the curing time of these resins. Many amines were found to have much stronger catalytic reaction on the silicone resins than the presently used triethanolamine and, in many cases, were so reactive that a modification was necessary. This was achieved by completely or partially reacting the amines with various aldehydes, thus creating a compound which is believed to decompose at high temperatures at which time the full effect of the amine is exerted on the silicone resin. The study provides information which may be applied directly to the preparation of various molding materials. Successful molding has been achieved in 2-min at 200°C or in 5-min at 165°C of a 2-in. disc 1/8-in. thick. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152-B. PU PL TR 18E. SIG Contract W36-039-sc-32011.

Effect of velocity on the tensile impact properties of methyl methacrylate, by Bryce Maxwell and J. P. Harrington. Princeton University. Plastics Laboratory. Nov 1950. 44p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107880

The history of impact testing of plastics is reviewed and the current theories of impact resistance are discussed. The effect of velocity on the energy absorbed by methyl methacrylate at various temperatures has been studied with the aid of two new testing machines. The results are interpreted in terms of the classical theories of mechanics of materials and the current theories of the rheology of high polymers. It is concluded that there are two distinct critical velocities of straining in this material; the lower one corresponding to the relaxation of the bonds restraining chain-chain slipping and the higher one corresponding to the relaxation of the secondary bonds involved in chain uncoiling. Both of these relaxations are temperature dependent; the lower one to a slight extent and the upper one to a marked extent. Above the two critical velocities the response of the material is purely elastic. A method of calculating the energy to break at rates of straining above the second critical velocity from the slow rate stress-strain curves is demonstrated. Contract no. DA36-039-sc-133. Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152 B-O. PU PL TR 19A. SIG Contract DA36-039-sc-133.

Effects of moderate biaxial stretchforming on tensile and crazing properties of acrylic plastic glazing, by B. M. Axilrod, M. A. Sherman, V. Cohen and L. Wolock. U. S. National Advisory Committee for Aeronautics. Oct 1952. 42p photos, diagr, graph, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107878

1. Plastics, Methacrylic - Tensile tests 2. Plastics, Methacrylic - Crazing 3. Plastics, Methacrylic - Stretching 4. NBS 1200 5. NACA TN 2779.

Investigation of arc resistance, by M. Olyphant, Jr. (C. H. Willis, consultant). Princeton University. Plastics Laboratory. Jul 1950. 110p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107830

Presented here are the results of a series of studies concerning standard test methods, the nature of the tracking process, the effect of various special test conditions and the behavior of materials exposed to high current pulse discharges and radio frequency arcs and corona. The results of numerous tests

and observations including high speed photographic studies of tracking are assembled to support tentative explanations and theories regarding the nature of the tracking process, and track initiation, and to account for differences in the behavior of materials. Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. PU PL TR 18G. SIG Contract W-36-039-sc-32011.

Low-loss, high arc resistance guanamine molding compounds, by J. Willoch and N. Vasileff. Princeton University. Plastics Laboratory. Jun 1950. 10p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107829

The purpose of this research was to develop materials which would meet the requirements of specifications JAN-P-14, MTS-E-3 and E-4. Compounds meeting the dielectric requirements for E-3 materials were obtained by using phenylaceto guanamine resin modified with 3% di-tertiary-butoxy-silanediol, and mica or Celite filler. The dielectric requirements of E-4 materials were met by using the same modified resin filled with 1/4" milled glass fibres primed with di-tertiary-butoxysilanediol. Dept. of the Army project: 3-99-15-022. Signal Corps project; 152-B. PU PL TR 18F. SIG Contract W36-039-sc-32011.

Selected government research reports. Vol. I: Plastics. Gt. Brit. Ministry of Supply. 1952. 454p photos, drawings (part fold), graphs, tables (5 fold. col.) Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $8.00. PB 107741

S. O. code no. 47-166-1. Published for the Technical Information and Documents Unit of the Department of Scientific and Industrial Research. Contents: no. 1. Mechanical properties of high polymers, by the Dept. of Colloid Science, Cambridge under direction of E.K. Rideal. Jun 1942. - no. 2. System polymer/plasticiser, by Dept. of Colloid Science, Cambridge, under direction of E. K. Rideal. Nov 1944. - no. 3. Plasticiser/polymer interaction, by the Geigy Co., Ltd. May 1946. - no. 4. Notes on the sorption of water by high polymeric materials, by A. Hammond (Based on R.A.E. report Jun 1944). - no. 5. Linear shrinkage of phenolic mouldings during post-curing stoving, by S. W. Hargreaves and J. H. Martin (Published in British plastics, May 1947). - no. 6. Use of flax shives in phenol-formaldehyde moulding powders, by Bakelite Ltd. (Based on Report for Controller of Chemical Research and Development, Ministry of Supply, 23 Dec 1941). - no. 7. Effect of fillers and other additions on the elastic modulus in compression and on the swelling of a phenol-formaldehyde resin, by M. E. Bedwell (Based on R.A.E. report May 1944). - no. 8. Investigation into the setting process of phenol formaldehyde resins, by M. E. Bedwell (Based on R.A.E. report May 1944). - no. 9. Note on the ductility of plastic materials, by C. Gurney and M.G.M. Pryor (Based on R.A.E. report May 1941). - no. 10. Effect of atmospheric humidity on the strength and dimensions of thermoplastics, by D. A. Baker (Based on R.A.E. report Mar 1944). - no. 11. Correction of the indicated impact value of brittle plastics, by P. W. Rowe (Based on R.A.E. report Sep 1943). - no. 12. Strength tests of a number of similar small mouldings in phenol-formaldehyde synthetic resin moulding materials, by S. Pearson (Based on R.A.E. report Aug 1942). - no. 13. Use of reinforced plastic material in aircraft construction (Based on Ministry of Aircraft Production, Scientific and technical memorandum). - no. 14. Directional strength and stiffness of fibrous materials, by J. E. Gordon (Based on R.A.E. report Dec 1943). - no. 15. Some factors influencing the properties of paper-reinforced synthetic resin sheet, by E.H.G. Sargent (Based on R.A.E. report Oct 1942). - no. 16. Microscopic examination of reinforced synthetic resin, by Clementina M. Gordon (Based on R.A.E. report Nov 1942). - no. 17. Strength of bolted joints in "Perspex", by S. Pearson (Based on R.A.E. report Aug 1944). - no. 18. Quantitative method for comparing "Perspex" polishes, by W. M. Bielak and J. Savage (Based on R.A.E. report Dec 1944). - no. 19. Synthetic resin glues: Influence of pH on the rate of hardening of cold-setting glues, by G. E. Little (Based on Ministry of Aircraft Production. Scientific and technical memorandum, 17 Jan 1945). - no. 20. Synthetic resin glues: Setting-time pH characteristics of cold-setting resins prepared from some monohydric phenols, by G. E. Little and H. M. Paisley (Based on Ministry of Aircraft Production. Scientific and technical memorandum Apr 1946). - no. 21. Chemical factors involved in the gluing of wood with cold-setting urea-formaldehyde (UF) resins: Failing load of gap joints, by W. G. Campbell and S. A. Bryant, appendix by Caroline B. Pettifor (Based on Ministry Aircraft Production. Scientific and technical memorandum Jan 1944).

Chemical Engineering and Equipment

Catalytic hydrogenation of some aryl-substituted aliphatic acids, by F. L. Schmehl and N. L. Smith. U. S. Naval Research Laboratory. Mar 1948. 11p drawing, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107843

The present investigation extends the hydrogenation of the aryl-substituted aliphatic acids to molecules with a longer aliphatic chain and (in some cases) with a more complex aromatic component. The conversion to the corresponding alicyclic derivative was accomplished by the method of high-pressure hydrogenation employing both nickel and platinum catalysts Three of the cyclohexyl-substituted aliphatic acids prepared in this investigation have not been previously reported in the literature. A fourth compound, previously described, has been prepared by the method of catalytic hydrogenation. These particular compounds suggest their use as rust inhibitors. NRL C3251.

Miscellaneous Chemicals

Correspondence, reports, and patent on production of anhydrous sodium hyposulfite. I. G. Farbenindustrie A. G., Leverkusen, Ger. Feb 1930-May 1939. 105f drawings, graph, tables (Text in German) Available from Library of Congress, Publi-

cation Board Project, Washington 25, D. C. Microfilm $4.50, Enlargement Print $15.00. PB 94993s

Documents listed in BIOS FR 1373, p. 37-38 as Doc. no. 10, 14, 16 - 26. Contents: BIOS/DOCS/2796/2104/10. Herstellung von hydrosulfit durch direkte elektrolyse in einer 800 amp. zelle (Production of hydrosulfite by direct electrolysis in an 800-ampere cell) by Dr. Kopsch, Jul 1935. - BIOS DOCS 2796/2104/14. Verfahren zur herstellung von hydrosulfit (Experiments in production of hydrosulfite by electrolytic method) by Dr. Fi, May 1935. - BIOS DOCS 2796/2101/16. Verfahren zur elektrolytischen herstellung von hyposulfit (Experiments in electrolytic production of hyposulfite) by Dr. Fi, Apr 1936. - BIOS DOCS 2796/2104/17. Uber die herstellung von natriumhyposulfit aus SO_2 und natriumamalgam (Production of sodium hyposulfite from SO_2 and sodium amalgam) by Dr. Nitzschke. Aug 1936. - BIOS/DOCS/2796/2118/18. Über die besprechung betr. hyposulfit (Report on isolation of hydrosulfites by vacuum evaporation) by Dr. Nitzschke. May 1938. BIOS/DOCS/2796/2118/19. Weitere ausbildung der verfahren der direkten und indirekten elektrolytischen hyposulfitherstellung (Further developments in direct and indirect electrolytic production of hyposulfite) by Dr. Nitzschke. May 1938. - BIOS/DOCS/2796/2104/20. Bericht über die besichtigung des Ludwigshafener hydrosulfitbetriebes am 2 Juni 1938 (Report on Ludwigshafen work with hydrosulfites on June 2, 1938) by Dr. Nitzschke. Jun 1938. - BIOS/DOCS/2796/2386/21. Patentanspruch I61 302 IVb/12i (22) Herstellung von wasserfreiem natriumhyposulfit (Patent application for production of anhydrous sodium hyposulfite). May 2, 1939. - BIOS/DOCS/2796/2386/22. Hydrosulfitbesprechung am 19 & 20.2.30 (Report on discussions of cost of the Leverkusen electrolytic process), by Dr. Haager. Feb 1930. - BIOS/DOCS/2796/2386/23. Stellungnahme zum patent I61, 302 IVb/12i, L. G. nr. 333 (Criticism of patent application) by Dr. Zahn. Mar 1939. - BIOS/DOCS/2796/2386/24. Vorläufige stellungnahme zur frage hydrosulfit conc. pulver (Further criticism on the question of hydrosulfite concentrated powder) by J. G. Zahn. Mar 1939. - BIOS/DOCS/2796/2386/25. Eindampfung von hydrosulfitlösung (Vaporization of the hydrosulfite solution) by Dr. Zahn. - Apr 1939. - BIOS/DOCS/2796/2386/26. Besuch Dr. Zahn im Lu. am 27.4.39: Eindampfung der hydrosulfit-lösung nach patent Dr. Nitzschke-Zahn (Visit of Dr. Zahn to Ludwigshafen on Apr 27, 1939. Vaporization of the hydrosulfite solution according to the patent of Drs. Nitzschke and Zahn) Apr 1939.
1. BIOS FR 1373 LD 2. Micro BIOS/DOCS/2796/2104/10 3. Micro BIOS/DOCS/2796/2101/14 4. Micro BIOS/DOCS/2796/2101/16 5. Micro BIOS/DOCS/2796/2104/17 6. Micro BIOS/DOCS/2796/2118/18 7. Micro BIOS/DOCS/2796/2118/19 8. Micro BIOS/DOCS/2796/2104/20 9. Micro BIOS/DOCS/2796/2386/21-26 10. Micro BIOS FD 751/48, Frames 1-105.

Investigations of methods of increasing life and capacity of lead acid storage batteries. I: Preliminary study of methods for evaluating the corrosion resistance of positive grid material, by W. H. Power, S. W. Rabideau, R. A. Kern, R. T. Pierce and J. J. Lander. U. S. Naval Research Laboratory. Jan 1947. 85p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photostat $11.25. PB 107841

Theoretical considerations are given to the causes of corrosion of the positive grid, nature of the corrosion film, cause of gassing, overvoltage of hydrogen and oxygen, and contamination of the negative plate by transfer of antimony from the positive grid. Desirable grid and plate characteristics are discussed. Methods of evaluating positive grid alloys are enumerated and experimental data given to allow correlation between laboratory tests and the behavior of the positive grid in service. The limitations of laboratory tests, particularly of short duration, to evaluate alloys are discussed. The corrosion resistance of positive grid alloys is believed to be related to the character of the oxide layer formed by anodizing in sulfuric acid. A compact and adhering coating is necessary to protect underlying metal from further attack, while a flocculent layer allows continued attack of the grid. The effects of heat treating and cold working antimonial lead alloys and the introduction of a small quantity of silver upon their physical properties and corrosion resistance are demonstrated. Although the particular heat treatment used enlarged the grain size of the alloys, it was beneficial in improving tensile strength. Corrosion resistance of low antimony alloys was adversely affected by the heat treatment. 1/10% silver was found to reduce grain size, improve tensile strength, and promote the formation of a compact and adherent corrosion film. A theory is presented to explain the behavior of silver and antimony as inhibitors of anodic corrosion of lead. NRL R2908.

Investigation of the hydrolysis of halogenated hydrocarbon compounds, by Kenneth L. Temple and John K. Wolfe. U. S. Naval Research Laboratory. May 1948. 13p drawing, tables (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107844

Hydrolytic stability has been determined for a variety of chlorinated and fluorinated organic liquids. Guide lines for future research are shown and a comparison is made with the results of Brockway and Livingston on the bonding distances in halogenated compounds. NRL C 3284.

Mechanism of ether cleavage, the cleavage of optically active secondary butyl methyl ether. Technical report no. 1 under Contract N7onr-45006, Project no. NR056199, by Robert L. Burwell, Jr., Lucien G. Maury and Lloyd M. Elkin. Northwestern University, Evanston, Ill. Jun 1950. 16p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107748

The stereochemistry of cleavage of optically active secondary butyl methyl ether by hydrogen bromide, acetyl bromide, acetyl chloride and acetic anhydride is reported. With ether and anhydrous hydrogen bromide, in a mole ratio of one, sec. butyl alcohol of configuration nearly +100% is obtained.

With acetic acid as a solvent, sec. butyl acetate of configuration nearly +100% is formed. With acetic acid as a solvent and an ether-hydrogen bromide mole ratio of 3.5, sec. butyl bromide of configuration nearly -100% results. With acetyl halides and a trace of stannic chloride as catalyst, sec. butyl halides of configuration roughly -50% results. Acetic anhydride under the same conditions forms sec. butyl acetate, configuration -20%.

Quantitative study of the far ultraviolet absorption spectra of diethyl ether, diethyl- and triethylamine, by Esther M. Coffin. Mount Holyoke College. Dept. of Chemistry, South Hadley, Mass. Jun 1949. 26p graphs Available from Library of Congress, Publication Board Project, Washington 25, D.C. Microfilm $2.00, Photostat $3.75. PB 107749

A reliable method for determining intensities in far ultraviolet absorption spectra has been developed and tested, and applied to a study of diethyl ether, triethylamine and diethylamine. A preliminary study of the far ultraviolet absorption spectra of ethyl vinyl ether and diethylamine has been made. The spectra obtained have been compared with those of related compounds, and possible interpretations are suggested. Report condensed from a thesis.

Removal of hydrogen sulfide and carbon dioxide from synthesis gas using di- and tri-ethanolamine, by H. W. Wainwright, G. C. Egleson, C. M. Brock, J. Fisher and A. E. Sands. U. S. Bureau of Mines. Oct 1952. 28p photo, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. Limited supply available from U.S. Bureau of Mines. Publications Office, 4800 Forbes St., Pittsburgh 13, Pa. PB 107952

1. Gas - Purification 2. Gas - Purification - Plant design 3. Hydrogen sulfide - Removal from gases 4. Carbon dioxide - Removal 5. Ethanol, 2-Amino - Uses 6. BM RI 4891.

Sketch of DEGUSSA organization and formulae relating to enamels. Deutsche Gold und Silberscheideanstalt, Frankfurt am Main, Ger. May 1946. 25f (Text in German and English) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Enlargement Print $5.00. PB 60903s2

Documents listed in BIOS FR 788, p. 13 and 40. Contents: BIOS DOCS/2045/1220/D1. Enamels for sheet and cast iron, by W. Kerstan. - BIOS DOCS 2045/1220/D2. Enamel formulas for copper and precious metals, by Herr Liepack. BIOS DOCS 2045/1220/D3. Formulas for gas opacifiers, by W. Kerstan. - BIOS DOCS 2045/1220/D4. Formulas for enamel colours, by Herr Liepack. - BIOS DOCS 2045/1220/D5. Compositions of borax and cobalt substitutes, by Herr Kerstan. - BIOS DOCS 2045/1220/D10. Description of Degussa organization (in English) by Herr Meyer. - BIOS DOCS 2045/1220/D22. Formulas for underglaze ceramic colours, by Herr Liepack. - BIOS DOCS 2045/1220/D23. Formulas for ceramic overglaze and glass colours, by Herr Liepack. - BIOS DOCS 2045/1220/D24. Acid-resisting ceramic colours, by Herr Liepack. - BIOS DOCS 2045/1220/D25. Formulas for ceramic glazes by Herr Kerstan. - Recipe for liquid gold, by Dr. Kollmar.

ELECTRICAL MACHINERY

Communication Equipment

Principles of design of single radio band interference reducing systems for radio control purposes. Hammond Research Corporation, Gloucester, Mass. Final report under Contract no. OEMsr-694. Jun 1943. 21p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107832

1. Radio interference - Elimination 2. Radio interference - Research 3. Radio, Remote control 4. Oscillators, Audio 5. Demodulators 6. OSRD 1534.

Adaptation to delayed side-tone-1, by Chester J. Atkinson. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla., and Ohio State University Research Foundation, Columbus, Ohio. May 1952. 11p diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107344

The side-tone of speakers was delayed while 60 phrases were read. These 60 phrases were read slower and louder than phrases read without delayed side-tone. There was no trend demonstrated during the course of reading the 60 phrases to indicate that speakers adapted to delayed side-tone. There was some increase in the loudness with which the first few phrases were read. Joint project report no. 12, Ohio State University Research Foundation, Columbus, Ohio, under Contract N6 onr 22525, Office of Naval Research Project Designation no. NR 142-992 and U. S. Naval School of Aviation Medicine, Bureau of Medicine and Surgery project NM 001 064.01.12.

Antenna development. Final report for period Jun 22, 1942 to Jan 26, 1944 under Contract OEMsr-441, by M. A. Trainer, C. A. Gunther, J. B. Coleman, John H. Roe. Radio Corporation of America R.C.A. Victor Div., Camden, N. J. Feb 1944. 25p photos, drawings, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107781

The report opens with a list of the principal factors which influenced the design of Block antennas. This is followed by a description of the Block I and Block III antennas in order, with references to previous Status Report. Some description is also included of a special tail mounting antenna, and of a dipole type. Construction and characteristics of a wide

bend antenna capable of covering more than a dozen twelve megacycle channels (about ±25% of the middle frequency) are described in considerable detail since there was no mention of this work in the previous Status Reports. A general discussion of the problem of directional properties of airborne radiating systems is included. It is pointed out that four factors, type of plane, type of antenna, location of antenna, and frequency, all affect the directivity, and that, as a result, each antenna installation presents a unique problem. Two methods of measuring directivity are described. NDRC 5.3-42. OSRD 6355.

Characteristics of directional-null antenna patterns produced by multi-element arrays, by C. V. Parker. U. S. Naval Research Laboratory. Mar 1948. 26p diagr, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107866

The analysis of directional-null antenna design begun in NRL Report R-3162 is extended to arrays of omnidirectional elements. Symmetrical arrays of four and six elements each are considered in some detail with equations derived for the power radiated, equivalent radiation resistance, slope of the central null, angular positions of minima, maxima, and nulls, and the amplitude of the maxima relative to the minima and also relative to the peak of the in-phase pattern having the same current distribution and element spacing. It is concluded that null-type antenna patterns may be obtained that are entirely free of nulls except in a chosen plane through the antenna by a suitable choice of element spacing and current, and furthermore, that the depth of minima may be controlled by the same means. In particular, it is shown that, in the case of a four-element array of this type, the only requirement is that the current distribution be tapered from the center outward and that the element spacing be less than one wavelength. Arrays of eight or more elements are more briefly considered with similar conclusions. NRL R 3245.

Electronics

Application of electronics to the detection and measurement of radioactivity, a course of six elementary lectures, an A.E.R.E. Memorandum, by H. Bisby. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1951. 82p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $2.50. PB 107588

AERE EL/L 3.
1. Radioactivity - Detection - Gt. Brit. 2. Radioactivity - Measurements - Gt. Brit. 3. Electronics - Use in detection of radioactivity - Gt. Brit. 4. AERE EL/L 3.

Bibliography, wave guide and cavity theory, compiled by Thelma Braverman and Jerome Lurye. New York University. Washington Square College of Arts and Sciences. Mathematics Research Group. Jun 1948. 36p Available from Chief, Administration Section Air Force Cambridge Research Center, 230 Albany St., Cambridge 39, Mass. PB 107928

A bibliography is presented, covering articles on wave guide and cavity theory and some diffraction studies applicable to waveguide problems concerned with coupling through holes or with radiation through apertures. The compilation is restricted to theoretical articles in which conclusions are established by mathematical methods. A few papers on the propagation of sound in tubes are noted, because the mathematical basis of the attack can be used in electromagnetic problems. A separate section is devoted to articles on the travelling wave tube, which is of interest because one novelty in the tube is the use of the helix as a waveguide. Contract no. W28-099-ac-170. Report no. 170-6.

Block simplification and improvement. Status report on Contract OEMsr-441 for period May 15, 1944 to Oct 31, 1945, by W. J. Poch and A. H. Turner. Radio Corporation of America. RCA Victor Division, Camden, N. J. Nov 1945. 21p diagrs (2 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107860

This report covers work done on Block Improvement and Simplification from May 15, 1944 to October 31, 1945 and is divided into two categories. 1. Application of automatic frequency control and clamp circuits to Block III. This work was undertaken in cooperation with the Naval Aircraft Modification Unit who greatly aided and facilitated the development and tests described in this report. 2. AVC and tuner development work on Block receivers. NDRC 5.3. OSRD 6394.

Counter counter measures for television. Progress report no. 1, period Jan-July 1, 1943 under Contract OEMsr-441, by T. L. Gottier. Radio Corporation of America. RCA Laboratories, Princeton, N. J. Aug 1943. 55p photos, diagrs (1 fold) Available from Library of Congress, Publication Board, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107853

Changes have been made in the television receiver circuits so that operation is satisfactory when the amplitude of noise pulses is approximately one thousand times the amplitude of the desired signal, provided the pulses are not in synchronism with the synchronizing pulses. The circuits covered in this report are described as low impedance automatic volume control (L.I.A.V.C.), automatic frequency control (A.F.C.), and multiple clipping (M.C.). RCAL order no. 13016.

Hot-wire sound generator, by M.F.M. Osborne and F. H. Holland. U. S. Naval Research Laboratory. Aug 1945. 35p drawing, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107867

1. Generators, Noise - Design 2. Sound, Underwater - Generation 3. NRL S2598.

Off-frequency c-w jamming, by C. M. Allred and A. L. Gardner. Massachusetts Institute of Technology. Radiation Laboratory. Mar 1946. 47p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107825

With the introduction of c-w jamming which is at the frequency of the pulsed signal, the signal threshold is raised not more than 6 db in a linear receiver which has no overloading. However, much greater impairment may result if the beat frequency between the c-w jamming and pulsed signal is appreciably attenuated by the video amplifier. The factors which influence this are: (1) The c-w power at the second detector, (2) the beat frequency and phase, (3) the video bandwidth. The influence of each of these factors is considered theoretically and correlated with the experimental results. For protection against this type of jamming, it is recommended that the video bandpass be at least as wide as the i-f bandpass. Contract OEMsr-262. MIT Rad Lab 910. NDRC Div 14.

Progress report for April - June 1952. National Research Council of Canada. Radio and Electrical Engineering Division. Jul 1952. 29p photo, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. Limited supply available free from National Research Council of Canada, Radio and Electrical Engineering Division, Ottawa, Canada. PB 107740

1. Radiophysics - Canada 2. Engineering, Electrical - Canada 3. Radar - Canada 4. Electronics - Canada 5. Electromedical research - Canada 6. Dielectric research - Canada 7. Navigational aids - Canada 8. NRCC ERA-234.

Report no. 15 under Air Force Contract AF33(038)-9853, June 17 to Aug 17, 1952, by R. P. Clausen. Sylvania Electric Products, Inc. General Engineering Dept. Radio Division, Emporium, Pa. Sep 1952. 14p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107930

1. Vacuum tubes, Cathode ray 2. Vacuum tubes, Cathode ray - Grids 3. Vacuum tubes, Cathode - Research.

Subminiature bridge interrogator and amplifier, by Joseph L. Coffey and Ward C. Low. Boston University. Upper Atmosphere Research Laboratory, Boston, Mass. Apr 1951. 19p photos, diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107927

Boston University has developed a subminiature 1250-cycle oscillator and amplifier especially for use with resistance or impedance bridge devices in remote installations requiring minimum size and weight and maximum resistance to effects of high shock and vibration. Contract no. AF 33(038)-12942. Technical note no. 11.

Synthetic radar echoes in the presence of FM jamming by A. M. Stone. Massachusetts Institute of Technology. Radiation Laboratory. Apr 1946. 38p photos, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107826

The signal threshold in the presence of jamming which consisted of an r-f carrier frequency-modulated by noise has been investigated. The independent variables were: (1) the i-f bandwidth; (2) the video bandwidth of the jamming noise; (3) the peak excursion frequency; (4) the ratio of rms to peak excursion frequencies; and (5) the strength of jamming carrier. The unmodulated carrier was in every case tuned exactly to the pulse carrier, and furthermore no overloading was present. The work reported here was done in 1944. Contract OEMsr-262. MIT Rad Lab 1035. NDRC Div 14.

Television recording project, by M. F. Hodges. U. S. Naval Research Laboratory. Sep 1952. 31p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 111072

The need for recording apparatus suitable for storing televised information has been evident as the number of applications to military operations has increased. A study has been made of the elements of a suitable recording system, and a start has been made toward producing an embodiment of current ideas for this equipment. In this report are discussed the factors dictating the choice of video-amplifier characteristics, camera-tv signal synchronization, recording rate, and possible future alternatives to the present film-recording technique. NRL R3999.

Vericon television equipment. Remington Rand, Inc. Electronic Division, Middletown, Conn. Final report under Contract no. OEMsr-187 covering the period from Nov 1, 1941 to Feb 1, 1945. Feb 1945. 104p photos, diagrs (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107822

Service project no. AC-36.
1. Television - Apparatus 2. Television - Cameras 3. Tubes, Television 4. NDRC Div 5.3-9.

Generators, Motors, Transmission

Focusing system for the electrostatic generator, an A.E.R.E. report, by H. S. Cockroft. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1951. 21p diagrs, graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 107694

The focusing effects and energy resolution obtainable from a 90° deflecting magnet are considered and it is shown that for best resolution and beam shape the slit should be a distance about 1.2 from the output face of the magnet. The angles of the magnet faces

and the width of the slit must be adjusted to suit the beam entering the magnet and the best resolution obtainable is then given by $(\frac{\delta\rho}{\rho})_{min} = .6\,\frac{a}{\bar{u}}$ where $\frac{a}{\bar{u}}$ is the minimum angle subtended by a beam diameter at the input face of the magnet and ρ is the radius of curvature of the beam in the magnet. The accelerator tube is then considered and the constants of an equivalent lens are determined. These are used to find what conditions the beam at the top of the tube must satisfy in order to use all the beam and get best resolution. Finally the lens system at the top of the tube is considered and the best position for the ion source determined. HD.512. S. O. code no. 70-674-0-28. AERE N/R 716.

FOOD AND KINDRED PRODUCTS

Dehydration of English fruit, by C. West, A. C. Hulme, C. R. Furlong, and G. H. Crouch. Gt. Brit. Dept. of Scientific and Industrial Research. Food Investigation Board. Mar 1952. 47p drawings, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107907

S. O. code no. 47-8-56.
1. Fruit - Dehydration - Gt. Brit. 2. Fruit, Dehydrated - Water content - Determination - Gt. Brit. 3. Fruit, Dehydrated - Sulfur dioxide content - Determination - Gt. Brit. 4. Sulfur dioxide - Detection - Gt. Brit. 5. DSIR FI SR 56.

Dehydration of potato granules, by A. M. Cooley, R. F. Fredrickson, Donald E. Severson. U. S. Quartermaster Food and Container Institute. Report no. 4 for period Aug 1, 1951 to June 1, 1952 under Contract no DA11-009-qm-13189. 1952. 42p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107809

Cooperating institution: University of North Dakota. Chemical Engineering Dept. Project no. 7-84-06-028.
1. Potatoes - Dehydration 2. QMC FCI Contract DA-11-009-qm-13189, Report no. 4.

Development of improved canned meat products, especially beef, by R. G. Tischer, John C. Bard and Henry Hurwicz. U. S. Quartermaster Food and Container Institute. Report no. 19 under Contract no. DA11-009-qm-318, for period covering Jul 1, 1950 to Jun 30, 1951. Jun 1951. 11p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107794

Project no. 7-84-06-026.
1. Meat, Canned - Processing 2. Beef, Canned - Processing 3. Iowa. Agricultural Experiment Station, Ames, Iowa 4. QMC FCI Contract DA11-009-qm-318, Report no. 19.

Improving standard rations - confections, by J. G. Woodroof. U. S. Quartermaster Food and Container Institute. Report no. 6 under Contract no. DA11-009-qm-10525, for period covering Jun 1, 1951 to Jun 1, 1952. Jun 1952. 14p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107797

Cooperating institution: University System of Georgia. Georgia Agricultural Experiment Station. Food Processing Dept., Experiment, Ga. Project no. 7-84-06-030.
1. Confectionery - Storage 2. Food rations - Confectionery 3. Georgia. Agricultural Experiment Station, Experiment, Ga. 4. QMC FCI Contract DA-11-009-qm-10525, Report 6.

Nutrition and resistance to low environmental temperature, by B. H. Ershoff. U. S. Quartermaster Food and Container Institute. Report no. 15 under Contract no. DA11-009-qm-7835 for period Jan 1 to Dec 31, 1951. 1952. 4p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107804

Cooperating institution: Energy W. Thurston Laboratory. Project no. 7-84-12-011.
1. Nutrition, Military 2. Low temperature research 3. QMC FCI Contract DA11-009-qm-7835, Report no. 15.

Physiological studies on spore formation and spore germination, by O. B. Williams, T. C. Fleming, E. E. Wiese, L. L. Campbell. U. S. Quartermaster Food and Container Institute. Report no. 18 (Termination report) for period 1 Oct 1950-30 Sep 1951, under Contract DA11-009-qm-1347. Oct 1951. 50p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107881

Collaborating institution: University of Texas. Dept. of Bacteriology. Project no. 7-84-17-012.
1. Clostridium botulinum 2. Bacteria - Spores - Physiology 3. QMC FCI Contract DA11-009-qm-1347, Report 18.

Report of the Food Investigation Board with the report of the Director of Food Investigation for the year 1951. Gt. Brit. Dept. of Scientific and Industrial Research. Food Investigation Board. Mar 1952. 46p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $.40. PB 107905

S. O. code no. 47-7-0-51.
1. Food - Research - Gt. Brit. 2. Food - Inspection - Gt. Brit.

Role of starch in bread staling, by R. M. Sandstedt, Robert Gates, Paul H. Figard and Vernon Arnold. U. S. Quartermaster Food and Container Institute. Report no. 14 under Contract no. DA11-009-qm-389, for period covering Jul 1, 1950, to Aug 31, 1951. Aug 1951. 17p tables Available from Library of Congress, Publication Board Project,

Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107796

Cooperating institution: University of Nebraska. Agricultural Experiment Station, Department of Agricultural Chemistry, Lincoln, Neb.
1. Bread staling - Role of starch 2. QMC FCI Contract DA11-009-qm-398, Report 14.

Study of some chemical factors involved in the "browning" of certain food constituents, by C. D. Ball and John C. Speck, Jr. U. S. Quartermaster Food and Container Institute. Report no. 18 under Contract no. DA11-009-qm-317, for period Jul 1, 1950 to Sep 30, 1951. Sep 1951. 2p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107795

Project no. 7-84-17-012.
1. Food - Analysis - Browning 2. Michigan State College of Agriculture and Applied Science. Dept. of Chemistry, East Lansing, Mich. 3. QMC FCI Contract DA11-009-qm-317, Report 18.

FUELS AND LUBRICANTS

Annual report of research and technologic work on coal, fiscal year 1951, by R. L. Brown and E. P. Carman. U. S. Bureau of Mines. Oct 1952. 114p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Photostat $15.00. Limited supply available free from U. S. Bureau of Mines, Division of Publication, 4800 Forbes St., Pittsburgh 13, Pa. PB 107799

1. Coal - Research 2. Fuels, Liquid - Research 3. BM IC 7647.

Determination of small amounts of metals in oils and fuels by X-ray absorption. Part I: Determination of lead, by Miles V. Sullivan. U. S. Naval Research Laboratory. Oct 1945. 34p photo, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107864

A method for the rapid determination of metallic particles in hydrocarbons has been developed. X-rays are generated in a molybdenum target tube with a 0 to 50 KV power supply and are detected by a Geiger counter tube after passing through an absorption cell containing the sample. A complete determination of tetraethyllead in gasoline can be made by an unskilled operator in five minutes with a precision of one percent or better. Lead may be detected by this means in any of the oils or fuels used by the Navy. Lead concentrations as low as 0.002 percent have been detected by this method, and it apperas that the limit may be pushed as low 0.0002 percent. Advantages of the method are speed, ease of operation and its non-destructive nature. A disadvantage is the amount of equipment necessary. NRL P2654.

Development of qualification test methods for gear lubricants. Armour Research Foundation, Chicago, Ill. Progress report no. 3 under Contract no. DA-11-022-ORD-905, Sep 15-Oct 15, 1952, by H. Ruwe Barton. Oct 1952. 7p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107893

For 1st-2d reports see PB 107585, PB 107682.
1. Gears - Lubrication 2. Lubricants - Testing equipment.

Investigation of silicone polymer fluids, part VIII: High temperature performance of silicone fluids in journal bearings, by J. E. Brophy, J. Larson and R. O. Militz. U. S. Naval Research Laboratory. Oct 1947. 18p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107842

Investigation covers use of dimethyl silicone polymer fluids and methyl phenyl copolymers as lubricants at elevated temperatures. For satisfactory operation of small bearing machine either a long break-in time or silicone pretreatment of bearing is desirable. Data on safe operating temperatures and rate of increase of viscosity are presented. NRL C 3192.

Microscopical study of German powder from a 21-cm aircraft rocket, by Charles Proffer Saylor. U. S. National Defense Research Committee. Apr 1944. 13p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107834

A sample of German rocket powder has been examined microscopically, mostly with the aid of microtome sections. The observations indicate that the powder, as carpet roll, was extruded from a press in which there was a spindle upon which the roll was placed. This spindle connected moderately smoothly to the spider that formed the axial hole. Because of the spindle, the legs that steadied the spider could be very light. The die and the interior of the press were faired very smoothly into each other so that there was little mixing in the powder during extrusion. The ratio of the diameter of the interior of the press to the diameter of the spindle was about 10. The ratio of the external diameter of the finished grain to the center hole was 7.8. The powder grain is 62 mm in diameter with an axial hole 8 mm in diameter. It contains artificial graphite and some quartz -- presumably as an impurity. A drawing suggesting some characteristics of the press is included. NDRC AOR A-267. OSRD 3512.

NACA investigation of fuel performance in piston-type engines, by Henry C. Barnett. U. S. National Advisory Committee for Aeronautics. 1951. 196p photos, diagrs, graphs, tables Available from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $1.50. PB 107719

1. Fuels, Aviation - Research 2. Fuels, Aviation - Antiknock 3. Fuels, Aviation - Additives 4. Fuels, Aviation - Varporization 5. Fuels, Aviation - Preignition 6. NACA 1026.

Temperaturverteilung in schmierschichten zwischen parallelen wärmedurchlässigen wänden (Temperature distribution in lubricating films between parallel heat-transfer walls), by G. Vogelpohl. Sep 1952. 17p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107793

Translated and edited by F. A. Raven from Zeitschrift für angewandte mathematik und mechanik vol. 31, no. 11/12, Nov/Dec 1951, p. 349-356.
1. Lubricants - Temperature - Germany 2. Fluids, Viscous - Heat conductivity - Germany 3. STS 150.

HIGHWAYS AND BRIDGES

Highway sufficiency ratings, presented at the 31st annual meeting, Jan 1952. Highway Research Board. 1952. 75p maps, graphs, tables Available from Highway Research Board, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. $.90. PB 107919

Contents: Sufficiency ratings as an administrative tool, by O. L. Kipp. - Arizona's experience with sufficiency ratings, by William E. Willey. - General comments on sufficiency-rating procedures, by John A. Swanson. - Possible areas of improvement in rating procedures, by P. R. Staffeld. - Considerations in rating urban streets, by Curtis J. Hooper. - Graphical presentation procedures, by James O. Granum. - Elemental versus composite ratings, by M. Earl Campbell. - Use of sufficiency ratings in long range planning, by Roy E. Jorgensen. - Relation of sufficiency ratings, tolerable standards, and priorities, by C. E. Fritts. - Appendix on procedures. HRB Bul 53. NRC 228.

Parking turnouts and rest areas. Highway Research Board. Summary and report by Project Committee on Parking Turnouts and Rest Areas presented at the 31st annual meeting, George B. Gordon, Chairman. 1952. 57p photos, drawings Available from Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. $.75. PB 107747

1. Roads - Roadside development 2. HRB SR 7 3. NRC 230.

Performance of concrete pavement on granular subbase. Highway Research Board. Presented at the 31st annual meeting, Jan 1952. 1952. 41p photos, maps, diagrs, graphs, tables Available from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. $.60. PB 107820

Contents: Effectiveness of granular bases for preventing pumping of rigid pavements, by Carl E. Vogelgesang. - Performance of concrete pavements on granular subbase, by W. E. Chastain and John E. Burke. 1. Pavements, Concrete - Deflection 2. Pavements, Concrete - Traffic tests 3. HRB Bul 52 4. NRC 226.

Prevention of wet-weather damage to surface dressings. Gt. Brit. Dept. of Scientific and Industrial Research. Road Research Laboratory, Harmondsworth, England. 1952. 10p drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.15. PB 107644

1. Roads - Surface treatment - Wet-weather damage - Gt. Brit. 2. DSIR RRL RN 14.

INSTRUMENTS

Design study of true free air thermometer. Armour Research Foundation, Chicago, Ill. Report no. 13 under Contract no. AF 33(038)-29978, by J. C. Hedge. Oct 1952. 17p drawing, diagr, graphs (2 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107920

For Report no. 12 see PB 107631.
1. Thermometers, Free air - Design 2. Probes, Temperature - Design 3. ARF Proj. no. 90-1049L, Report no. 13.

Evaluation studies of colorimetric and conductimetric dosimeters. Eastman Kodak Co. Distillation Products Industries Division, Rochester, N. Y. Monthly progress report no. 6 under Contract DA 18-108-CML-3617, by M. E. Johnson, J. C. Swartz and A. R. Hamilton. Oct 1952. 10p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107819

A fast scale of ten (scaler - type 1070A), an A.E.R.E. report, by G. A. Howells. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1951. 37p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25. PB 107554

A scale of ten is described having a mean dead time of about 0.25 sec and a maximum counting rate for random pulses of 4.10^5 p.p.s. The scaler consists mainly of a discriminator, a scale of five and a normal scale of two. The discriminator, whose mean dead time is fixed by a delay line, responds to input pulses 0.05 sec wide. The scale of five is based on the energy storage principle and is unique in that the five energy levels are stable. Indication is provided on a meter. H.D. 567. S. O. code no. 70-674-0-32. AERE EL/R 728.

Handbook, maintenance instructions: Multimeter TS-352/U. U. S. Air Force. Dec 1951. 16p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C.

Microfilm $1.75, Photostat $2.50. PB 107737

Supersedes edition of 31 May 1951.
1. TS-352/U (Multimeter) 2. Multimeters, Electronic - Maintenance and repair 3. AAF TO 16-35 TS 352-7.

Handbook, operation and service instructions: Volt-ohm-milliammeter model 665-J-2 (Jackson Electrical). U. S. Air Force. Oct 1949. 7p photo, drawing, diagr, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107746

1. 665-J-2 (Milliammeter) 2. Milliammeters - Operation 3. Milliammeters - Maintenance and repair 4. AAF TO 17-15BA-27.

Investigations for design of digital calculating machinery. Harvard University. Computation Laboratory. Progress report no. 5 covering period May 10, 1949-Aug 10, 1949 under Contract W19-122-ac-24, by Peter Lindley and Jean Crawford. 1949. 137p photo, drawings, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.50, Photostat $17.50. PB 107827

1. Computers, Digital - Design 2. Computers, Digital - Components 3. Mark I (Computer) 4. Cores, Magnetic 5. Pulse communication - Storage systems 6. Equations, Integral.

Low voltage self-quenching Geiger counters, by S. H. Liebson and H. Friedman. U. S. Naval Research Laboratory. Oct 1947. 10p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107876

Counters filled with small percentages of the halogens mixed with the inert gases produced self-quenching counters. The life-times of these counters in terms of total counts are apparently unlimited. Several mixtures exhibited thresholds below 250 volts at total pressures ordinarily used in counters. Pulse size, efficiency, and quenching characteristics are similar to those obtained with argon-alcohol Geiger-Mueller counters filled with a ten-percent alcohol mixture to total pressures in excess of 10 cm Hg. The percentages of halogens required to make good counters were about the same as the optimum concentrations reported for quenching metastable states in the rare gases. NRL N3180.

Mechanical air-blast gauges, by W. E. Gordon and P. E. Shafer. Woods Hole Oceanographic Institution. Underwater Explosives Research Laboratory, Woods Hole, Mass. Mar 1945. 56p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107859

This report covers the work done at UERL on mechanical air-blast gauges. The designs of and the results obtained from several types of gauges are discussed. These are: 1. Free-piston gauge. This proved particularly useful in measuring the blast from explosives fired in enclosed spaces. It provides a direct indication of the second integral of the pressure versus time curve from which an impulse versus time curve is obtained by measuring slopes. 2. Spring-piston gauge. By proper adjustment of the period of a piston acting against a helical spring it is possible to obtain an indication that is very closely proportional to the positive impulse. The gauge is proposed as one suitable for routine testing of bombs and bomb fillings. 3. NOL ball-crusher gauge. This has been adapted to the measurement of air-blast pressures in the region above 50 lb/in.^{2}. 4. In addition proposals for other designs are discussed as well as two types that have been experimented upon but have not proved successful. Contract OEMsr-569. NDRC A-371. OSRD 6249.

Number of configurations of linear high polymers. Little, Arthur D., Inc., Cambridge, Mass. Technical report no. 3 under Contract N6-onr-228, T. O. II, Project NRO33243, by G. W. King. Nov 1949. 51p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107751

The number of configurations of simple linear long chain molecules has been investigated by means of punched cards on which the coordinates of the atoms in the chains are recorded. The model used was the generally accepted one of fixed inter-atomic distances and the carbon tetrahedral valence angle with restricted rotation. The number of configurations a high polymer can assume is fundamental, not only in determining the absolute entropy, but also in determining the number of terms which enter into the partition function when averaging all possible complexions of the system to get the thermodynamic functions. The method of counting the number of configurations is described, and the effect of excluded volume is analyzed. The length of the Markoff process required to exclude all steric interactions was shown to be the length of the chain itself. C-57848.

Parts catalog: Multimeter TS-352/U. U. S. Air Force. Aug 1951. 16p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107738

1. TS-352/U (Multimeter) 2. Multimeters, Electronic - Parts 3. AAF TO 16-35 TS 352-8.

Parts catalog: Multimeter TS-352/U. U. S. Air Force. Dec 1951. 8p drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107738r

Partial revision of PB 107738.
1. AAF TO 16-35TS 352-8 revised.

Photoelectric pyrometer for the measurement of luminous flame temperatures, by J. A. Curcio and D. V. Estes. U. S. Naval Research Laboratory. Jul 1948. 16p photo, diagr, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107877

By means of photo-multiplier tube covered with interference filter transmitting spectral band at 5520A, radiant intensities of luminous flames were measured first against a dark background and then with a mirror so placed behind the flame that radiation was redirected, thereby increasing flame thickness. Filter system was calibrated and application of Wien's and Kirchoff's radiation laws provided relation between photocell currents and flame temperatures. Flame temperatures determined by this method were about 10-15 percent lower than temperatures obtained by sodium line reversal. NRL N3319.

Progress in the study of the thermal insulation and corrosion protection of range-finders. First report, by James S. Strong and Marvin O. Yeiter. U. S. Naval Research Laboratory. Anacostia Station, Washington, D. C. Mar 1945. 32p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107852

Recently a number of rangefinders which has been in service for some time were brought in to be serviced and when the felt lagging was removed from the outer tube, severe corrosion was discovered. There was no evidence of this corrosion on the outside of the lagging which appeared to be in perfect condition. The responsibility for this was laid to the insulation which was wet. Therefore, it is considered imperative to replace this method of insulation by some other which will avoid such corrosive conditions. This report covers the progress thus far made toward this objective. It has been shown that insulation is necessary to prevent rapid radiation and that shading is more effective than lagging in minimizing heat absorption. Further work in another climate is proposed in order to improve and extend the findings reported herein. NRL P 2378.

Sonic locator development II: MR sonar (the rotoscope), by H. P. Knauss, edited by Kathleen Ahern and Dwight E. Gray. Harvard University. Underwater Sound Laboratory. Feb 1944. 34p photos, diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107778

This report is concerned with the development of the Rotoscope, an echo-ranging device which scans the entire horizon continuously by transmitting sound from an omnidirectional projector and receiving on a mechanically rotated directional microphone. Plan Position Indication (PPI) is employed. The Rotoscope proved useful chiefly as a laboratory tool in the advancement of Sonic Locator Development generally, and, more specifically, as forerunner of the improved scanning method known as Commutated Rotation Sonar (CR Sonar). Problems to be met in devising satisfactory scanning systems are discussed, and the scanning technique exemplified in the Rotoscope is compared with present "searchlight" procedure. A description of the principal elements of the device emphasizes functional behavior during actual experiments rather than circuit or design details. Particular consideration is given to the employment of SLC (Simultaneous Lobe Comparison) techniques in place of ordinary amplitude indication to take advantage of the definite directionality of echoes. The section of the report having to do with Rotoscope tests and results includes discussion of the design and behavior of auxiliary devices employed during experimentation to evaluate and improve the functioning of the equipment. The purpose of Time Varied Gain (TVG) are defined and a brief account is given of difficulties arising from bottom effects in shallow waters. Contract OEMsr-287. NDRC 6.1-1346. OSRD 3510.

Testing methods and comparative tests of torsion meters, by F. L. Loucks, Jr., W. A. Von Wald and Meredith Wilson. U. S. Naval Research Laboratory. Dec 1946. 164p photos, drawings (part fold) diagrs (part fold), graphs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $6.25, Photostat $21.25. PB 107851

This investigation was conducted in order to develop methods of testing marine torsionmeter performance with the aim of setting up specifications for acceptance of these instruments for Navy Trial Board use, to compare the performances of all available marine torsionmeters and to stimulate the development of these instruments by the purchase of experimental models for test purposes. Bench and reduced power tests were developed for linearity, stability, effects of varying line voltage and frequency, centrifugal effect, the ability to measure torsional oscillation, warm-up time and temperature effect. Performances of four experimental torsionmeters were observed and are presented for comparison. Conclusions and recommendations for the further improvement of both tests and instruments are submitted. NRL O 3302.

Turbojet thermocouples, by G. W. Quick. U. S. National Bureau of Standards. Sep 1950. 17p photos, drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107840

The microstructures of five Chromel-Alumel turbojet thermocouples which failed under test at temperatures between 1500° and 2000°F were examined to determine the cause of failure. The failures were primarily caused by intergranual oxidation. In some instances, loose insulators may have contributed to the failure of the wires. The Alumel wires were oxidized more than the Chromel wires; and intergranual oxidation of the latter wires was particularly severe near the thermocouple beads. The characteristic of constantan for use as thermocouple material was investigated and found inferior to both Chromel and Alumel. It is concluded that bare Alumel and Chromel wires are not suitable for use above 1500°F for long periods of time. The recommendation is made that stainless steel having high nickel and chromium contents should be investigated for thermocouple use. AAF TR 6084.

MACHINERY

Refrigerated oil diffusion pump baffle, an A.E.R.E. report, by R. S. Barton. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1951. 11p drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.50. PB 107763

A standard Metropolitan-Vickers six inch oil diffusion pump baffle was operated at temperatures varying from -60 to +13°C while working in conjunction with an 063B type diffusion pump, and the resulting changes in ultimate pressure within the system under evacuation were observed. The effect on pump speed was also noted. HD. 453. S. O. code no. 70-674-0-18. AERE G/R 642.

Simulation of linearized dynamics of gas-turbine engines, by J. R. Ketchum and R. T. Craig. U. S. National Advisory Committee for Aeronautics. Nov 1952. 25p photo, diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107958

A general method of simulation is presented, whereby linearized dynamics of gas-turbine engines may be simulated in most orderly fashion with greatest economy of equipment and with most direct use of engineering data. Correlation of experimental and simulated responses of a turbojet engine are shown. Use of generalization factors in determining the coefficients necessary for simulation of engine dynamics is discussed. NACA TN 2826.

MEDICAL RESEARCH AND PRACTICE

Symposium on burns, held at the request of the Committee on Medical Sciences of the Research and Development Board, National Military Establishment, by the Subcommittee on Burns of the Committee on surgery of the National Research Council, Nov 2-4, 1950. National Research Council. 1951. 211p drawings, diagrs, graphs, tables Available from National Research Council, Publications Office, 2101 Constitution Ave., N. W., Washington, D. C. $1.50. PB 107902

Contents: Introduction, by I. S. Ravdin. - Social responsibilities of scientists, by Detlev W. Bronk. - I. Scope of the burn problem, by Everett I. Evans. - II. Radiation component of atomic bomb explosions, by William T. Ham, Jr. - III. Physiologic problems concerned with flame throwers, by James M. Walker. - IV. Laboratory production of high and low temperature burns: A. High temperature by Herman E. Pearse and W. J. H. Butterfield. - B. Low temperature and radiation, by James W. Brooks. - V. Fluid and electrolyte requirements in burns: A. Electrolytes and water, by Oliver Cope, O. J. Purnell and Everett I. Evans. - B. Albumin, plasma, and whole blood, by Dickinson, W. Richards, Jr., Carl A. Moyer, Arnold M. Salzberg. - C. Globin, by Max W. Strumia and Robert B. Pennell. - D. Dextran, by Gunnar Thorsen and J. P. Bull. - E. Gelatin, by J. L. Oncley, I. S. Ravdin, Everett I. Evans. - VI. Renal and pulmonary disturbances accompanying severe burns: A. Renal disturbance, by Charles H. Burnett. - B. Pulmonary injury, experimental, by Alan R. Moritz. - C. Respiratory injuries in man resulting from severe burns, by Maxwell Finland. - VII. Stress, injury, and endocrine response: A. Humoral factors relating to survival and healing of severely burned patients, by George W. Thorn. - B. Relation to burns by J. S. L. Browne. - C. Metabolic response to thermal injury, by Francis D. Moore. - VIII. Treatment of the burned area: A. Closed dressing principle, by Harvey S. Allen. - B. Exposure method, by Edwin J. Pulaski and A. B. Wallace. - IX. Infections in severe burns: A. Mode of infection and its control, by Leonard Colebrook. - B. Antibiotic treatment of severe cutaneous burns, by William A. Altemeier. - X. Nutritional care of burn patients. A. Burn anemia, by G. Watson James III. - B. Nutritional care, by Stanley M. Levenson. - XI: Early debridement of burn wound: A. Pyruvic acid, by Samuel C. Harvey. - B. Streptokinase-streptodornase, by William S. Tillett. - C. Enzymatic agents, by James F. Connell, Jr. - D. Collagenase debridement of burn slough, by William A. Altemeier. - XII. Plastic repair of severe burns: A. Early skin grafting with notes on final rehabilitation, by James Barrett Brown. - B. The burned hand, by Sumner L. Koch. - XIII. Disaster problems of burn care: A. Introduction by Truman G. Blocker, Jr. - B. Triage and evacuation, by Paul Hayes. - C. Civil defense planning, by Robert H. Flinn. - XIV. General review and restatement of problems, by Everett I. Evans. - Appendix: Participants.

METALS AND METAL PRODUCTS

Analysis of uranium-tantalum and uranium niobium alloys, an AERE report, by G.W.C. Milner and A. J. Wood. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Apr 1952. 15p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107652

Satisfactory procedures are described for the analysis of uranium-tantalum and uranium-niobium alloys containing up to 25% tantalum and niobium respectively. They are based on the separation of the tantalum and niobium from uranium by extracting the fluorides of the former elements with methyl ethyl ketone. After the evaporation of the solvent from the combined organic extracts, the residue is ignited to about 800°C to yield the pentoxides of tantalum and niobium. After the removal of the fluoride ions from the aqueous solutions, the uranium is determined by precipitation as ammonium diuranate and finally igniting to U_3O_8. Absorptiometric procedures are included for the determination of the trace amounts of unextracted tantalum and niobium. Appendix I: Recommended procedure for tantalum-uranium alloys. - Appendix II: Recommended procedure for niobium uranium alloys. HD 670. S. O. code no. 70-674-0-90. AERE C/R 895.

Conductivity of some molten silicates on fayalite basis, by G. Björling. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1952. 33p drawing, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107949

The conductivity of molten fayalite (differous silicate), with varying additions of di- and monocalcium silicate, dizinc silicate and dimanganese silicate, oxides of calcium, magnesium, aluminium and zinc, sulphides of some heavy metals and finally fluor spar has been measured. Only the mobile cations and especially the smaller ones can participate in the current transfer; the big anions lie immobile in the melt. The temperature variation of the conductivity follows the logarithmic law of Rasch-Hinrichsen. Melts with high iron content such as pure fayalite will show an increase of their conductivity by about 30% for a temperature rise of 100°C, but slags with about 30% Fe show a corresponding increase of 50%. Acta polytechnica 109, Chemistry including Metallurgy series vol. 3, no. 2. Also published as Kungliga Tekniska Högskolans Handlingar nr. 59.

Current status of the shell-mold or "C" process of precision casting metals, by Roy W. Tindula. U. S. Office of Technical Services. Oct 1952. 20p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. Mimeo: $.25. OTS IR 7734 revised. PB 106640r

Diffusion of cobalt, iron and nickel into titanium carbide, by Robert C. Turnball. New York State College of Ceramics, Alfred, N. Y. Jan 1951. 4p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 108028

The method of fabrication of dense titanium carbide samples by hot pressing in an induction furnace is described. Intimate contact between the radio-active cobalt metal and the titanium carbide sample is assured by electroplating the metal onto one face of the cylinder. The photographic response of NTB-2 plates to radio cobalt radiation is being determined in the form of an H and D curve. Contract no. AF33(038)-16190. Letter report no. 1.

Effects of cyclic loading on mechanical behavior of 24S-T4 and 75S-T6 aluminum alloys and SAE 4130 steel, by C. W. MacGregor and N. Grossman. U. S. National Advisory Committee for Aeronautics. Oct 1952. 53p photos, drawing, diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107775

An investigation was conducted to determine the effects of cyclic loading on the mechanical behavior of 24S-T4 and 75S-T6 aluminum alloys and SAE 4130 steel. Specimens of the three materials were subjected to various numbers of prior fatigue cycles both below and above the fatigue limits. Special slow-bend tests were employed to show the effects of prior cycles of fatigue stressing on the transition temperature to brittle fracture for SAE 4130 steel and on the energy-absorption capacity of the aluminum alloys. Micrographic studies were made to observe and measure crack formation and propagation and additional special tests were conducted to supplement the results of the slow-bend tests. These included Charpy impact tests, microhardness surveys, tension tests, and fretting-corrosion studies. NACA TN 2812.

Engineering method for estimating notch-size effect in fatigue tests on steel, by Paul Kuhn and Herbert F. Hardrath. U. S. National Advisory Committee for Aeronautics. Oct 1952. 35p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107879

Neuber's proposed method of calculating a practical factor of stress concentration for parts containing notches of arbitrary size depends on the knowledge of a "new material constant" which can be established only indirectly. In this paper, the new constant has been evaluated for a large variety of steels from fatigue tests reported in the literature, attention being confined to stresses near the endurance limit; reasonably satisfactory results were obtained with the assumption that the constant depends only on the tensile strength of the steel. It is also shown that the material constant can be used in an empirical formula to estimate the size effect on unnotched specimens tested in bending fatigue. NACA TN 2805.

Grösseneinfluss und randeinfluss auf die festigkeit der werkstoffe (Effect of volume and boundary on strength of materials), by G. Meyersberg. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1952. 122p photo, drawings, graphs, tables (Text in German) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.00, Photostat $16.25. PB 107948

The first part of this paper describes and gives an analysis of the "volume-influence", i.e. the fact that a test specimen of a smaller volume has a greater strength than one of greater volume. The next part of the paper describes the "boundary—influence", which is especially important in the case of cast iron. This has an effect contrary to the "volume—influence". Finally the experiments are described in detail. Acta polytechnica 108, Physics and applied mathematics series vol. 2, no. 2. Also published as Kungliga Tekniska Högskolans Handlingar nr. 58.

Improved magnetic materials. Lehigh University. Institute of Research, Bethelem, Pa. Dept. of the Army project no. 3-49-15-022. Signal Corps project no. 32-152-B-O. Signal Contract DA 36-039-sc-61.

First quarterly report for the period Oct 15, 1950 to Jan 15, 1951, by Richard R. Fountain, Andrew J. Griest, Eugene Zukas, Wai Liang Chu, Ernest Costello, Harold V. Anderson, Joseph F. Libsch. Jan 1951. 57p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107813

Experiments have been conducted to reduce the oxygen content of 50% iron-50% cobalt cores produced by powder metallurgy in an effort to reduce the coercive force. Incomplete results indicate that reduction of the mixed iron and cobalt powders prior to pressing may decrease the coercive force, and that prolonged sintering may improve the saturation and retentivity. Analysis of the data obtained in the study of mechanical and magnetic hardness in Vicalloy I (52% Co, 38.5% Fe, 9.5% V) indicates that precipitation of the gamma phase during aging is not the primary reaction contributing to magnetic hardness. Instead it appears that magnetic hardness is associated primarily with a transition state between order and disorder achieved by aging the alloy after quenching from the solution temperature as suggested recently by Geisler. Additional data, including X-ray diffraction and electrical resistivity measurements appear necessary to establish the true nature of magnetic hardening in Vicalloy I. Preliminary results are presented to show the effect of various production variables on the density and magnetic properties of Vicalloy I prepared by powder and metallury. Data is presented to show that the coercive force of Alinco V magnets is decreased sharply by heating to 675°C for ten to fifteen minutes.

Second quarterly report for the period Jan 15, 1951 to Apr 15, 1951, by Richard R. Fountain, Andrew J. Griest, Eugene Zukas, Wei Liang Chu, Ernest Costello, Harold V. Anderson, Joseph F. Libsch. Apr 1951. 45p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50 Photostat $6.25. PB 107814

Apparatus for thermal analysis of magnetic alloys is complete and was used to determine the temperatures of the order-disorder transformation and the alpha-gamma phase transformation in 50% iron-50% cobalt base alloys containing small amounts of titanium, i.e., 0-0.6%. Sample data for thermal analysis are given. The magnetic properties of these alloys in the as-sintered condition are reported. New apparatus was completed to reduce the oxygen content of the iron and cobalt powders prior to pressing. The optimum properties produced using this procedure are given.

Third quarterly report for the period Apr 15, 1951 to Jul 15, 1951, by Richard R. Fountain, Andrew J. Griest, Eugene Zukas, Wei Liang Chu, Ernest Costello, Harold V. Anderson, Richard N. Rhoda, Joseph F. Libsch. Jul 1951. 42p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25. PB 107815

Several series of alloys have been prepared in which small amounts of silicon, titanium, beryllium and aluminum have been added to the 50% iron-50% cobalt alloy. Thermal data are given to show the influence of silicon and titanium on the alpha to gamma and order-disorder transformation temperatures. Complete electrical resistivity data and initial x-ray data are presented to show the influence of aging temperature and time upon solution treated Vicalloy I.

Fourth quarterly report for the period July 15, 1951 to Oct 15, 1951, by Richard R. Fountain, Andrew J. Griest, Eugene G. Zukas, Wei Liang Chu, Ernest Costello, Harold V. Anderson, Richard N. Rhoda, Joseph F. Libsch. Oct 1951. 97p diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 107816

Fifth quarterly report for the period Oct 15, 1951 to Jan 15, 1952, by Richard R. Fountain, Richard N. Rhoda, Jean Marie Emin, Alexander Schwarzkopf, Joseph F. Libsch. Jan 1952. 96p photos, graphs, (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 107817

Sixth quarterly report for the period Jan 15, 1952 to Apr 15, 1952, by Joseph F. Libsch, Wei Liang Chu, Ernest Costello, Harold V. Anderson, Richard N. Rhoda, Jean Marie Emin, Alexander Schwarzkopf. Apr 1952. 81p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.75, Photostat $11.25. PB 107818

Insulation of risers for ferrous castings, by James R. Power. U. S. Naval Research Laboratory. Sep 1948. 14p photos, table Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $.50. PB 111071

Description of experiments conducted with an inexpensive method of insulating risers on iron and steel castings. Material, a mixture of 40% by weight of sawdust, 26% dextrine and 34% water, is pressed into desired shapes, dried, coated with refractory wash, and molded in position upon a pattern to form riser cavity. Advantages and disadvantages are given for employment of insulating risers. NRL M 3360.

Melting and refining of secondary brass and bronze alloys, by Roy W. Tindula. U. S. Office of Technical Services. Oct 1952. 11p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.25. PB 111059

1. Brass alloys - Refining 2. Bronze alloys - Refining.

Plating of engine parts. U. S. Naval Air Station, Pensacola, Fla. Final report. Nov 1950. 119p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.75, Photostat $15.00. PB 107783

A final report on plating of engine parts is presented. The data presented cover preliminary investigations, experimental plating of internal engine parts, endurance and service testing of engines with plated internal parts, corrosion testing of engines with plated internal parts by unprotected outdoor storage, and production plating of internal engine parts. In regard to the value of 0.0001 in. cadmium-tin alloy plated coatings applied to the steel internal parts, it is concluded that the coatings will effectively prevent corrosion of the engine parts, even under adverse operating and storage conditions, during one

or more major overhaul periods. Also the coating can be efficiently and economically applied, removed, and reapplied, provided special equipment is used, and plate parts can be cleaned and handled during overhaul, without damage to the coatings, provided reasonable care is exercised. TED no. PEN 251000.

Purification of semimicro quantities of tin, an A.E.R.E. report, by F. Hudswell and J. S. Nairn. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1951. 13p drawings, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107690

A method is given for the purification of small amounts of tin, (ca. 250 mg), from copper, lead, iron and silica. The process involves the fractional distillation of stannic chloride followed by the hydrolysis of this material and the hydrogen reduction of the stannic oxide obtained. The only reagents required are water, chlorine and hydrogen. The impurities are removed to individual limits of less than 1 part in 10^4. HD/473. S. O. code no. 70-674-0-22. AERE C/R 650.

Research toward development of non-corrosive metals and magnetic alloys, and the production of magnetic alloys by powder metallurgy. 14th quarterly report under Contract no. W36-039-sc-32033 for the period Jun 15-Sep 15, 1949, by Richard W. Fountain, Fredric C. Hacket, Frank H. Laxar, Joseph H. Libsch. Lehigh University, Bethlehem, Pa. Oct 1949. 26p drawing, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107986

Dept. of the Army project: 3-99-15-022. Signal Corps project: 152B. For 1st-11th reports see PB 102724-102734.
1. Iron-cobalt alloys - Magnetic properties 2. Metals, Non-corrosive - Research 3. Alloys, Magnetic - Corrosion prevention 4. Metallurgy, Powder 5. SIG Contract W36-039-sc-32033, Report no. 14.

Sag resistant properties of metals and alloys, by W. J. Plankenhorn and D. G. Bennett. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Oct 1950. 23p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107985

Sag resistant properties of ingot iron, low carbon steel, Ti-Namel, four titanium-boron bearing metals, designated 1446, 1447, 1448 and 1449, stainless steels type 302, 310, 316, 321, 347, and 430 and Inconel were evaluated. A number of metals were ceramic-coated and tested. Contract no. W33-038-ac-14520. Report no. 53. AAF TR 6451.

Temperature coefficient of Young's modulus of Masumoto's low expansion alloy, by H. E. Stauss, D. S. Billington, R. N. Dean and F. L. Martin. U. S. Naval Research Laboratory. Aug 1947. 12p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107848

Measurements have been made of the temperature coefficient of Young's modulus of a low-expansion alloy similar to Invar, but containing cobalt, iron and chromium, and no nickel. The measurements showed that the temperature coefficient of the alloy is positive, whereas most metals (except Invar) have a negative coefficient. It is concluded that there is at least one alloy containing cobalt, iron and chromium, and no nickel, which has a zero temperature coefficient of Young's modulus like Elinvar. To make the measurement, a new "dynamic" method of determining Young's modulus was developed. NRL M 3159.

Utilization of low-grade ores, by John D. Sullivan and S. Frederick Ravitz to Working party no. 9 of the Subcommittee for Cooperation in Scientific Research on the Use of Loco-grade ores. Battelle Memorial Institute, Columbus, Ohio. Sep 1952. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107983

1. Metals - Recovery 2. Ore - Processing.

METEOROLOGY AND CLIMATOLOGY

Annual meridional tide in the atmosphere, by Jerome Spar. Prepared for Air Research and Development Command. Geophysics Research Division, Air Force Cambridge Research Center, Cambridge, Mass. under Contract AF 19 (122)-49. New York University. College of Engineering. Dept. of Meteorology and Oceanography. Research Division. 1952. 10p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107979

The annual oscillation of the surface pressure in a zonally symmetrical atmosphere is calculated for the case of a simple annual temperature wave in one hemisphere. The linearized equation of motion and continuity are integrated with respect to height. The annual temperature wave is postulated as a function of height, time and latitude. The surface pressure oscillation is then found, by the method of continued fractions, as a function of latitude and time. According to the theory the surface pressure reaches a maximum value in winter near latitude 40 degrees. There is no pressure variation at the equator. A secondary minimum occurs at the pole in spite of the fact that the temperature variation is assumed to be a maximum at the pole. Project no. 122, Scientific report no. 1.

Notes on the theory of large-scale disturbances in atmospheric flow with applications to numerical weather prediction, by Philip Duncan Thompson. U. S. Air Force. Cambridge Research Center. Geophysics Research Division, Cambridge, Mass. Jul 1952. 101p diagrs, graph Available from Library of Congress, Publication Board Project,

Washington 25, D. C. Microfilm $4.50, Photostat $13.75. PB 107900

The problem of predicting the behavior of large-scale disturbances in the mean horizontal flow of the earth's atmosphere, which is directly connected with the problem of predicting the day-to-day changes of surface weather conditions, has been studied from the standpoint of formulating and solving the hydrodynamical equations which govern the flow. AAF GRD P 16.

On the possibility of experimental models of the polar front wave, by Dave Fultz. Chicago. University. Hydrodynamics Laboratory. 1952. 14p photos Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107981

1. Meteorological research 2. Atmospherics - Waves 3. Models, Meteorological.
Scientific report no. 4 under Contract no. AF 19 (122)-160.

Self consistent calculation of the dissociation of oxygen in the upper atmosphere, by Harry E. Moses. New York University. Washington Square College of Arts and Sciences. Mathematics Research Group. Apr 1952. 22p graphs Available from Chief, Administration Section Air Force Cambridge Research Center, 230 Albany St., Cambridge 39, Mass. PB 107935

In a previous paper a self-consistent model was set up for the dissociation of oxygen in the upper atmosphere under the assumption of number balance and radiative energy balance and a form of the barometric equation. In the present paper a similar model is used, but the requirement of radiative energy balance is dropped and a temperature distribution is assumed. The resulting calculations indicate that for this model the dissociation region is much narrower than in the previous model and that it occurs at lower altitudes. Research report no. CX-2. Contract no. AF 19 (122)-463.

Weather and Alaskan insects, by Richard L. Pratt. U. S. Climatic Research Laboratory, Lawrence, Mass. Aug 1949. 27p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107882

1. Insects - Effects of weather 2. Entomology - Research 3. Microclimatology 4. QMC EPS 156.

MINERALS AND MINERAL PRODUCTS

Bibliography on americium, prepared by the Information Office, Atomic Energy Research Establishment Harwell, Berks. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Apr 1952. 6p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107664

H. 13.446. Unclassified 546.799.5, 669.825. S. O. code no. 70-674-0-80.
1. Americium - Bibliography - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE Inf/Bib. 86.

Coating of low carbon steel, by W. J. Plankenhorn and Robert G. Hicks. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Oct 1948. 16p photos, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107810

Contract W33-039-ac-14520 (16071), Project no. MX-1035.
1. Coating, Ceramic - Heat resistance 2. Steel - Coatings, Ceramic 3. ILU DCE 30.

Development of a radioactive source for a training aid. U. S. Chemical Corps. Chemical and Radiological Laboratories. Radiological Division. Army Chemical Center, Md. Interim report, by James C. Kerrigan. Aug 1952. 18p photos, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107630

This report covers the development of a radioactive training aid source for the United States Army, which will be used primarily for the calibration of survey instruments. The objective of the Radiological Division was to design the source, with its associated container and handling device, taking cognizance of low cost and ease of manufacture with a view toward standardization. The work was performed under Project 4-12-55-001. The training aid consists of an encapsulated and standardized radioactive cobalt 60 source of 80 to 120 mc, a cylindrical lead shield which is permanently fastened in a 3/4 in. plywood carrying case and a mechanical remote control handling device. Project 4-12-55-001. CC CRL IR 158.

Formulation and development of refractory ceramic base coats for ingot iron and alloy metals, by Dwight G. Bennett, W. J. Plankenhorn, Terry F. Newkirk. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Jun 1949. 15p photos, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107811

Contract W33-038-ac-14520 (16071) Project no. MX-1035.
1. Coatings, Ceramic 2. Alloys - Coatings, Refractory 3. Iron - Coatings, Refractory 4. ILU DCE 41.

Selected government research reports. Vol. 10: Ceramics and glass. Gt. Brit. Ministry of Supply. 1952. 166p photos, drawings, diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $5.75. PB 107912

S. O. code no. 47-166-10. Published for the Technical Information and Documents Unit of the Dept. of Scientific and Industrial Research. Contents: Report

no. 1. Use of ceramic coatings in gas turbine combustion chambers, by F. G. Code Holland. (Based on N.G.T.E. memorandum Feb 1948). - Report no. 2. Apparatus for the determination of the bend strength of ceramic materials at temperatures up to 1100°C, by S. Grover, J. P. Roberts and W. Watt (Based on R.A.E. Tech. note May 1946). - Report no. 3. Microscopical investigation of mechanical breakdown in sintered aluminum oxide, including observations on reflected light examination, by J. P. Roberts (Based on R.A.E. Tech. note Jan 1948). - Report no. 4. Axial loading of sintered alumina tensile test pieces, by J. P. Roberts and W. Watt (Based on R.A.E. report Mar 1949). - Report no. 5. Mechanical properties of sintered alumina, by J. P. Roberts and W. Watt (Based on R.A.E. report Nov 1949). - Report no. 6. Variation on restivity with temperature of sintered aluminum oxide used for the insulators of sparking plugs, by E. C. Railton (Based on R.A.E. report Mar 1946). - Report no. 7. Thermal stresses in non-ductile high temperature materials, by F. J. Bradshaw (Based on R.A.E. Tech. Note Feb 1949). - Report no. 8. Improvement of ceramics for use in heat engines, by F. J. Bradshaw (Based on R.A.E. Tech. note Oct 1949). - Report no. 9. Some experiments on the hot pressing of Zirconium carbide powder at 2000°C, by A. R. Hall and W. Watt (Based on R.A.E. Tech. note May 1949). - Report no. 10. Effect of the surrounding atmosphere on the delayed fracture of glass, by C. Gurney and S. Pearson (Based on R.A.E. report Nov 1948). - Report no. 11. Fatigue in mineral glass under static and cylic loading, by C. Gurney and S. Pearson (Based on R.A.E. report May 1945). - Report no. 12. Delayed fracture in glass, by C. Gurney (Based on R.A.E. report May 1946). - Report no. 13. Testing of glass optical flats, gelatine filters and register glasses for use in aircraft cameras, by J. H. Dickson (Based on R. A. E. Tech. note Mar 1943).
1. Alumina, Sintered - Mechanical properties - Gt. Brit. 2. Alumina, Sintered - Tensile tests - Gt. Brit. 3. Aluminum oxide - Electrical properties - Gt. Brit. 4. Aluminum oxide - Spectrum analysis - Gt. Brit. 5. Aluminum oxide - Crystal structure - Gt. Brit. 6. Ceramics, Heat resisting - Bending tests - Gt. Brit. 7. Ceramics - Testing apparatus - Design - Gt. Brit. 8. Cameras, Aerial - Filters - Testing methods - Gt. Brit. 9. Filters, Glass - Testing methods - Gt. Brit. 10. Filters, Gelatine - Testing method - Gt. Brit. 11. Glass - Tensile properties - Gt. Brit. 12. Spark plug insulators, Ceramic - Gt. Brit. 13. Combustion chambers - Coatings, Ceramic - Gt. Brit. 14. Zirconium carbide powders - Hot pressing - Gt. Brit. 15. Gt. Brit. Dept. of Scientific and Industrial Research. Technical Information and Documents Unit.

ORDNANCE AND ACCESSORIES

Automatic scoring device for gun fire control systems Mark 57 and Mark 63, by H. P. Birmingham and R. S. Sackett. U. S. Naval Research Laboratory. Jun 1947. 10p photo, diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107865

A device is described which is designed for use in evaluating the performance of pointers in tracking by radar with the Gun Fire Control Systems Mark 57 and Mark 63. The device receives information from the pointing-error channels of the radar, and after modifying this information, utilizes it to provide a measure of tracking accuracy through the use of timing clocks. The limitations of other methods of evaluating this kind of tracking, such as by optical checksighting or by use of the kymograph, are discussed in the appendix. NRL R 3098.

Ballistic tests on concrete slabs. II: Effect of nose shape, by J. Gordon Stipe, Jr. Princeton University, Princeton, N. J. Mar 1946. 24p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107782

A series of tests was made using caliber .50 projectiles of different nose shapes and 41 concrete slabs having thicknesses from 1.5 to 9.0 in. The velocity limits for perforation and for scabbing were determined by bracketing. Firing tests were made at normal incidence and at obliquities of 20°, 40°, and 60°. These tests were made in the spring of 1944 and have not been previously reported because of work of higher priority. The data are given here with no attempt to analyze the results. Contract OEMsr-260. For part I see PB 48208. OSRD 6638. NDRC Memo A-112M.

Block equipment used in glider bombs, by R. W. Clark, A. E. Jackson, R. R. David. National Broadcasting Company. Field service report, Dr. H. L. Dryden, Eglin Field, Fla. Jun 25 to Jul 7, 1943. Jul 1943. 12p photos Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107777

1. Bombs, Glider - Tests 2. Television - Apparatus 3. Television - Cameras 4. OSRD 1990.

Measurement of various ballistic quantities on a projectile moving in the bore of a gun, by Nicholas M. Smith, Jr. and J. Allen Crocker. Carnegie Institution of Washington, Geophysical Laboratory. Mar 1944. 85p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D.C. Microfilm $3.75, Photostat $11.25, PB 107833

Contract OEMsr-51.
1. Gun barrels - Friction - Measurement 2. Ballistics - Gages 3. Ballistics, Interior - Measurement 4. Ballistics, Projectiles 5. NDRD AOR A-259 6. OSRD 3376.

Ordnance and terminal ballistics, vol. 14, Aug 15 to Oct 15, 1945. U. S. National Defense Research Committee. Oct 1945. 37p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107858

A frangible projectile has been developed which can be fired in air-to-air firings at a lightly armored target airplane. The present report considers the leads necessary to obtain hits with the caliber .50 API-M8 projectile and the caliber .30 T44 frangible projectile when a fighter attacks another fighter on a theoretical lead-pursuit curve in a horizontal plane. Work performed under Contract OEMsr-260 with Princeton University and Contract OEMsr-1284 with Duke University. Contents: 14a. Calculated leads for aerial gunners using the APIM8 caliber .50 projectile and the T44 caliber .30 frangible projectile. VI: Fighter versus fighter case, by George E. Bowden and Marcus E. Hobbs. - 14b. Sound waves produced by longitudinal vibrations induced in a projectile by armor impact, by C. W. Lampson and C. W. Curtis. - 14c. "Explosion" of paper yaw card due to impact of a flat-ended projectile, by H. B. Davis and L. F. Shipman. - 14d. Tables for computing the mass, center of gravity, and moments of inertia of a projectile with tangent ogival nose, by O. Koksharova and C. W. Curtis. OSRD 6120.

Use of aerial mines as a means of defending urban areas against attacks by aircraft, by R. E. Gibson. U. S. National Defense Research Committee. Aug 1940. 18p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107776

1. Mines, Anti-aircraft 2. Balloons, Barrage 3. Civilian defense 4. Carnegie Institution of Washington. Geophysical Laboratory 5. NDRC A-2 6. OSRD 6.

PACKING AND PACKAGING

Basic design data for the use of fiberboard in shipping containers, by T. A. Carlson, K. Q. Kellicut, E. F. Landt. U. S. Quartermaster Food and Container Institute. Report no. 28 for period Jul 1, 1951-Jun 30, 1952 under Contract no. 49-106-525-52. 1952. 3p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107806

Cooperating institution: Forest Products Laboratory, Madison, Wis. Project no. 7-91-03-012.
1. Containers, Fiber - Design 2. Fiberboard - Specifications 3. Shipments, Overseas - Packaging 4. U. S. Forest Products Laboratory, Madison, Wis. 5. QMC FCI Contract 49-106-525-52, Report no. 28.

Effect of flash-drying precoat enamels on internal can temperatures, by Ellery H. Harvey. U. S. Quartermaster Food and Container Institute. Report no. 1 (termination report) for period 1 Jun 1951-30 Nov 1951 under Contract no. DA11-009-qm-10427. 1951. 31p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107807

Cooperating institution: Illinois Institute of Technology. Food Engineering Dept.

1. Enamels - Effect on container temperature 2. Containers - Coatings - Temperature effects 3. Canning and preserving - Research 4. Illinois Institute of Technology. Food Engineering Dept.

Improving standard containers, five-in-one combat rations, by J. G. Woodroof. U. S. Quartermaster Food and Container Institute. Report no. 5 for period May 1, 1951 to May 1, 1952 under Contract no. DA11-009-qm-10434. 1952. 21p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107808

Cooperating institution: Georgia Agricultural Experiment Station. Project no. 7-91-03-014.
1. Containers, Food - Tests 2. Food rations - Storage 3. Georgia. Agricultural Experiment Station.

JA-4 Carpenter Airlite fiber drums for the storage of impregnite XXCC3. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Interim report, by Milton A. Raun. Sep 1952. 25p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107875

Project 4-91-06-001.
1. XXCC3 (Impregnite) 2. JA-4 (Drums) 3. Containers, Fiber 4. Impregnants - Storage 5. CC CRL IR183.

PERSONNEL APTITUDE TESTING

Analysis of results of field trials to determine the feasibility of an aptitude census, by Robert L. Thorndike and Elizabeth P. Hagen. U. S. Air Training Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Jul 1952. 56p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.75, Photostat $7.50. PB 107951

Contract no. AF 33(038)-13474. Project no. 510-022-0001.
1. Ability tests 2. Columbia University. Teachers College 3. U. S. Bureau of the census 4. AAF HRRC RB 52-22.

Assignment of personnel to jobs, by D. F. Votaw, Jr. and J. T. Dailey. U. S. Air Training Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Aug 1952. 26p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107727

Project no. 503-001-0016. Contract no. AF 33(038)-11045.
1. Personnel, Flying - Classification 2. Ability tests 3. AAF HRRC RB 52-24.

PHOTOGRAPHIC AND OPTICAL GOODS

Bibliography of motion pictures and film strips on materials handling. U. S. Office of Technical Services. Aug 1952. 41p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Mimeo: $.50. PB 111026

1. Material handling - Motion pictures - Bibliography 2. Motion pictures - Bibliography 3. OTS FB2.

Fluorite spectrograph of high aperture, by C. J. Silvernail. California. University. Institute of Geophysics. Jul 1952. 11p drawing, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107980

A high aperture fluorite spectrograph designed for laboratory investigations of weak spectral sources is described. The spectrograph has been designed for the study of the afterglows and other chemiluminesces of nitrogen, oxygen and gaseous mixtures important to upper atmosphere research. In particular it was important to extend the present studies from the visible and near ultraviolet to the far ultraviolet (fluorite) region. This has been achieved through the use of fluorite instead of quartz elements. With the substitution of different spherical mirrors, the spectograph is also adaptable to the visible and infra-red regions of the spectrum. Specifications are given for an instrument having a speed of f/2.0 with a field angle of twelve degrees, a focal length of approximately 9.4 inches and a dispersion of 18 A per mm. in the third order ultraviolet. Scientific report no. 1 under Contract no. AF 19 (122)453.

Handbook, overhaul instructions: Recording camera, type 0-19, part no. 1000 (Vought Co.) U. S. Air Force and U. S. Bureau of Aeronautics. Nov 1951. 10p photos, drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107733

This publication replaces AN 10-10EA-21 dated 25 May 1951.
1. Cameras, Recording - Maintenance and repair 2. 0-19 (Recording camera) 3. AN 10-10EA-21.

Handbook, overhaul instructions: Recording camera, type 0-19, part no. 1000 (Vought Co.) U. S. Air Force and U. S. Bureau of Aeronautics. Revised. Jan 1952. 4p drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25.
1. AN 10-10EA-21, revised. PB 107733r

Handbook, service and operations instructions: Recording camera, type 0-19, part no. 1000 (Vought Co.) U. S. Air Force. Nov 1951. 10p photos, diagrs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107732

This publication replaces T. O. no. 10-10EA-20 dated 10 August 1951.
1. Cameras, Recording - Operation 2. 0-19 (Recording camera) 3. AAF TO 10-10EA-20.

Handbook, service and operations instructions: Recording camera, type 0-19, part no. 1000 (Vought Co.) U. S. Air Force. Revised. Jan 1952. 4p drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25.
1. AAF TO 10-10EA-20, revised. PB 107732r

Parts catalog: Recording camera, type 0-19, part no. 1000 (Vought Co.) U. S. Air Force and U. S. Bureau of Aeronautics. Nov 1951. 8p drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107734

This publication replaces AN 10-10EA-22 dated 10 August 1951.
1. Cameras, Recording - Parts 2. 0-19 (Recording camera) 3. AN 10-10EA-22.

Phosphorography. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Dept. of the Army project no. 3-99-04-052. Signal Corps project no. 39-195B. Signal Corps Contract W36-039-sc-38198.

First quarterly report covering the period Mar 15-Jun 15, 1949, by John J. Dropkin. Jun 1949. 26p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107883

The work of this quarter has been primarily concerned with two phases. The first was the preliminary investigation of quenching phosphors, the effect of quenching activator and base material on per cent. quenching, and the effect of infrared intensity on quenching. The second phase dealt with the preparation of infrared-sensitive phosphors in powder form and the development of the technique of preparation of films of these powders to be used in further tests. In addition, an apparatus has been built for glow curve measurements on both quenching and IR phosphors in order to determine the trap depths and lifetime in these traps for the purpose of studying the mechanism of the storage properties and decay properties of the phosphors.

Second quarterly report covering the period Jun 16-Sep 15, 1949, by J. J. Dropkin. Sep 1949. 19p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107884

During this quarter the quenching properties of zinc sulfide:copper:cobalt and zinc sulfide:cadmium sulfide:copper:cobalt have been investigated further with particular emphasis on the speed of quenching for different intensities of infrared light. Contrast obtained for widely different infrared intensities is low

and the time of exposure needed are of the order of ten to twenty seconds. The apparatus for the measurement of rise time of infrared sensitive phosphors has been completed and is described.

Third quarterly report covering the period Sep 16-Dec 15, 1949, by J. J. Dropkin. Dec 1949. 20p drawing, diagrs (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107885

During this quarter, equipment has been constructed for measuring the dependence of rate of quenching on temperature with a view to finding a more satisfactory quenching rate for photographic purposes. The rise time apparatus required modification for satisfactory operation and the changes are described. Some preliminary work on an AC method for measuring photoconductivity is described.

Fourth quarterly report covering the period Dec 16-1949, to Mar 15, 1950, by J. J. Dropkin. Mar 1950. 19p photos, diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107886

During this quarter the equipment for the temperature dependence of infrared quenching was calibrated after some necessary modification. A preliminary run on the temperature quenching of a ZnS:Cu:Co phosphor indicated that the apparatus is functioning properly. The rise time equipment is operating and the shutter speed has been measured with it. The rise time of a B-1 phosphor has been observed to test the equipment. The known long decay time of stimulated phosphorescence of this phosphor makes it unsuited for photographic application. A low samarium series has been prepared and is under test. The AC method for photoconduction measurement has been improved by a 60 cycle rejection filter. Photoconduction measurements have been made of a B-1 phosphor under infrared illumination. The method works but the dark current is still about ten times as large as the maximum signal.

Fifth quarterly report covering the period Mar 16-Jun 15, 1950, by J. J. Dropkin. Jun 1950. 26p photo, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107887

Progress is reported in the development of research conducted on infrared stimulable and quenching phosphors for possible utilization in infrared photography. The temperature-sensitive phosphor system ZnS; CdS: Ag: Co was checked for the effect of varying the concentrations of the base materials and the activators on the temperature at which steepest quenching occurs. For small concentrations, the amount of Ag and Co has no effect, and only the ratio of ZnS to CdS determines the temperature of maximum quenching. The shutter on the rise time apparatus was improved so that its speed is now 10^{-4} sec. The photocurrent to dark current plus leakage ratio was improved about six-fold. A discussion is given of the efficiency of infrared phosphors from the point of view of their use as a contact coating on an photographic film, to extend the film range into the infrared.

Sixth quarterly report covering the period Jun 16 to Sep 15, 1950, by J. J. Dropkin. Sep 1950. 22p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107888

This quarter the dependence of infrared quenching on temperature at different levels of infrared and ultraviolet radiation was investigated for ZnS:Cu 10^{-4}: Co 10^{-6} and also for ZnS:Cu 10^{-4}:Fe, Ni, or Mn. The time required for onset of quenching was also determined. No increase in amount of quenching, contrast in quenching, or speed of quenching was found between room temperature and 240°C at which temperature fluorescence ceases. The rise time of the B-1 phosphor has been determined as a function of intensity. The rise is faster for higher intensities. This would improve contrast if the emission during the rise time (order of 5 milliseconds) could produce a latent image. Work on storage decay in the dark of Standard VII shows that the phosphor loses 50% of its stimulability in the first 10 minutes. The photoconductivity apparatus was under test and some improvement in performance obtained.

Final report covering the period Mar 15, 1949 to Dec 31, 1950, by John J. Dropkin. Dec 1950? 94p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $4.25, Photostat $12.50. PB 107889

Progress in the research on infrared stimulable and infrared quenching phosphors for possible utilization in infrared photography is described. For both types of phosphors, the dependence of infrared response, both as to wavelength and intensity, was investigated as a function of activator concentration and type of activator used. Methods for the preparation of suitable uniform phosphor films are discussed. Speed and intensity of response and of decay were determined for both types of phosphors.

Photographic film, paper, and chemicals, AAF specifications, by G. T. Sowers. U. S. Army Air Forces Board, Orlando, Fla. Aug 1944. 27p drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107929

Existing AAF Specifications for photographic film, paper, and chemicals were reviewed, and requirements and basis of issue were determine. It was concluded that numerous items of film, paper, and chemicals should be deleted from the stock list. A recommended list of all types of film, paper, and chemicals to be accepted as standard was drawn up. It was further recommended that numerous changes in film, paper, and chemicals specifications be made. Project no. (M-4) 372.

PHYSICS

General

New linear operational calculus, by Frank W. Bubb. U. S. Air Force. Wright Air Development Cen-

ter, Wright-Patterson Air Force Base, Dayton, O. May 1951. 42p diagrs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.50, Photostat $6.25.
PB 107941

1. Linear systems - Computing methods 2. Equations, Linear 3. AAF TR 6581.

Simplified methods for the evaluation of transients in linear systems, by L. von Hámos, B. Jansson and Th. Persson. 1952. 33p diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107950

Two practical methods for the evaluation of the transient behaviour of linear systems — servo-mechanisms, mechanical or electrical filters, amplifiers, automatic control systems etc. — from their frequency response are described. Both methods, the graphical and the numerical, are based on the same principle of Fourier-synthesis. The methods can also be used for the calculation of certain inverse Laplace-transforms. The methods are characterized by great simplicity. No expensive mathematical machines or other aids are required. The accuracy is sufficient for many technical applications. Acta polytechnica 112, Physics and applied mathematics series vol. 2, nr. 3.

Table of the summed ordinates and incremental areas of overlapping Gaussian distribution curves, by J.R. Dixon, E. W. Parrish, Jr., G. L. Carr and T. B. Glans. U. S. Chemical Corps. Chemical and Radiological Laboratories. Munitions Division, Army Chemical Center, Md. Aug 1952. 63p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $3.00, Photostat $8.75. PB 107629

Project 4-04-15-007.
1. Gaussian law (Mathematics) 2. Trajectory determination 3. Probability 4. Missiles - Distribution 5. Tables, Range.

Nuclear

Boron trifluoride for neutron detection, preparation and investigation of the product, an A.E.R.E. report, by F. Hudswell, J. S. Nairn and K. L. Wilkinson. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1951. 32p drawings, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.25.
PB 107691

The preparation of oxygen-free boron trifluoride from the crude cylinder gas is described, with full details of the necessary precautions. The methods of testing for impurities include measurements on the mass spectrometer and buoyancy balance; infra-red absorption, vapour pressure measurements, gas-volumetric analysis and neutron counting efficiency have also been employed. HD.544. S. O. code no. 70-674-0-23. Contents: Appendix I: Preparation of boron trifluoride-diethyl ether complex. - Appendix II: Preparation of boron-trifluoride-calcium fluoride compound. - Appendix III: Generation of air-free boron trifluoride. - Appendix IV: Methods of filling counters. AERE C/R 651.

Chemical systems sensitive to radiation. Monthly report no. 15, Sep 1-30, 1952, under Contract no. DA18-108-CML-2562, by Irving A. Berstein, Wolfgang G. Rothschild, Florence F. Spalding, Earle C. Farmer. Tracerlab, Inc., Boston, Mass. Sep 1952. 15p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.75, Photostat $2.50.
PB 107894

1. Dosimeters 2. Gamma rays - Intensity 3. Gamma rays - Absorption 4. Sensitizers - Reactions.

Cross sections for the photodisintegrations $^{12}C(\gamma, 3\alpha)$ and $^{16}O(\gamma, 4\alpha)$, an A.E.R.E. memorandum, by F. K. Goward and J. J. Wilkin. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Mar 1952. 11p graphs, tables Available from British Information Services 30 Rockefeller Plaza, New York 20, N. Y. $.45.
PB 107762

H. 13,251. S. O. code no. 70-674-65.
1. Gamma rays - Nuclear reactions - Gt. Brit. 2. Bremsstrahlung - Nuclear reactions - Gt. Brit. 3. Carbon - Gamma reactions - Gt. Brit. 4. Carbon, Radioactive - Gt. Brit. 5. Oxygen - Gamma reactions - Gt. Brit. 6. Oxygen, Radioactive - Gt. Brit. 7. Atomic power - Research - Gt. Brit. 8. AERE G/M 127.

Effect of pile irradiation on the emanating power of alumina, an A.E.R.E. memorandum, by J. N. Gregory and S. Moorbath. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1952. 4p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30.
PB 107759

H. 12,899. S. O. code no. 70-674-0-93.
1. Alumina, Activated - Effect of temperature - Gt. Brit. 2. Atomic piles - Reactivity - Gt. Brit. 3. Atomic power - Research - Gt. Brit. 4. AERE C/M 129.

Energy flux and average energy of neutrons scattered by the walls of a laboratory, an A.E.R.E. report, by (Mrs) M. E. Mandl. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1951. 15p diagrs, graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65.
PB 107669

The energy flux of neutrons scattered back to the source is calculated for a source at the centre of a spherical room. The average energy of the returned neutrons is calculated by comparison with the formula given in T/R 563 for the neutron flux. The walls of the room are assumed to be of some non-capturing material having scattering properties similar to concrete. H.D. 529. S. O. code no. 70-674-0-31. AERE T/R 727.

Estimation of free acidity in solutions of thorium nitrate, an A.E.R.E. report, by L. Airey. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1952. 5p graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107760

H. 12,958. S. O. code no. 70-674-0-95.
1. Thorium nitrate - Solutions - Acid content - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE C/M 132.

Extraction of phosphorus 32 from pile-irradiated sulphur at the Curie level of activity, an A.E.R.E. report, by W. J. Arrol. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Mar 1951. 8p drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107765

H.D. 532. S. O. code no. 70-674-0-36.
1. Phosphorus, Radioactive - Separation from radioactive sulfur - Gt. Brit. 2. Sulfur, Radioactive - Radioactive phosphorus separation - Gt. Brit. 3. Atomic power - Research - Gt. Brit. 4. AERE I/R 748.

Fitting of a distribution curve of known shape, but arbitrary origin and scale, an A.E.R.E. report, by D. J. Behrens. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1951. 9p diagr, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 107766

S. O. code no. 70-674-0-42.
1. Gaussian law (Mathematics) - Gt. Brit. 2. Probability - Gt. Brit. 3. Linear systems - Computing methods - Gt. Brit. 4. Statistical theory - Gt. Brit. 5. Radiation counters - Mathematical analysis - Gt. Brit. 6. Mathematical equations and solutions - Gt. Brit. 7. Curve fitting - Gt. Brit. 8. Atomic power - Research - Gt. Brit. 9. AERE T/M 50.

Flame photometric analysis, an A.E.R.E. report, by K. Saddington, W. Fullwood, and A. A. Smales. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1950. 21p drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.90. PB 107789

The use of the flame photometer as an analytical instrument is discussed, and descriptions are given both of the Beckman model and of an instrument constructed at Harwell by the authors. Difficulties encountered in the use of the flame photometer when applied to the analysis of complex solutions are described, together with suitable techniques designed to overcome these difficulties. Comprehensive references are given to the application of this instrument to a wide range of problems. HD/463. S. O. code no. 70-674-0-20. AERE C/R 644.

Low geometry proportional counter for α counting, an A.E.R.E. report, by R. Hurst, G. R. Hall and (Mrs.) K. M. Glover. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1951. 26p drawings, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 107761

The operation of the Ward Chamber has been investigated in considerable detail and the possible errors assessed. Using the optimum working conditions the instrument is shown to be both very stable and accurate. It can be used for the counting of accurate α standard sources and, in general, for the counting of high activity sources. HD. 455. S. O. code no. 70-674-0-21. AERE C/R 647.

Magnetron design, the hole and slot resonator, an A.E.R.E. report, by A. W. Aikin. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1950. 5p graph Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107768

S. O. code no. 70-674-0-10.
1. Resonators, Hole and slot - Gt. Brit. 2. Vacuum tubes, Magnetron - Design - Gt. Brit. 3. Atomic power - Design - Gt. Brit. 4. AERE X/R 609.

Mathematical analysis of the continuous flow system for measurement of thoron emanating power, an A.E.R.E. report, by J. N. Gregory and J. Howlett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1950. 25p diagrs, graphs, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.00. PB 107785

When the continuous flow system is used to measure a fluctuating emanating power, the changes which occur in the ionization chamber are not necessarily exactly identical with the emanating power changes. The system has a finite time constant of responses, dependent on its physical construction and electrical circuits, and this causes a lag and distortion in the observation of emanating power variations. This paper makes an attempt to calculate the magnitude of these effects in order to make corrections in accurate work, and to provide data for interpreting the output of a continuous flow system. The mathematical conclusions are quite general and could be applied to any flow system of gas analysis. S. O. code no. 70-674-0-2. AERE C/R 490.

Neutron crystallography, an A.E.R.E. report, by J. Thewlis. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1951. 17p diagrs graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $.75. PB 107764

An outline is given of the principles underlying the application of neutron diffraction to crystal analysis. A comparison with X-ray analysis is made and the similarities and differences between the two are underlined. A short account of the experimental techniques involved is presented and a survey is made of crystallographic applications up to date. Future developments are then discussed. HD. 509. S. O. code no. 70-674-0-27. AERE G/R 707.

Note on the use of tetra ethylene glycol (T.E.G.) as a spreading agent in the preparation of uniform plutonium sources, an A.E.R.E. memorandum, by R. Hurst and (Mrs.) K. M. Glover. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Feb 1951. 3p Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.30. PB 107917

T.E.G. has been tried as a spreading agent in the production of uniform plutonium sources and has been found satisfactory for all normal purposes. S. O. code no. 70-674-0-47. AERE C/M 100.

Self-diffusion of uranium ions in solution, an A.E.R.E. report, by K. Saddington. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1950. 13p graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107788

The self-diffusion coefficients of the uranium ions in perchlorate solutions having uranium concentrations less than 0.01 molar have been determined, and used as a guide to the degree of aggregation which can take place in such solutions. It is concluded that, up to pH 4.7, complex ions containing two or three uranium atoms are probably in equilibrium with the uncondensed uranyl ion, but that at greater pH values the particles which are present are colloidal in nature. HD 445. S. O. code no. 70-674-0-14. AERE C/R 626.

Short-lived antimony fission products and their descendants, an A.E.R.E. report, by G. B. Cook. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1951. 5p table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.35. PB 107692

Antimony isotopes of 45s, $\sim$ 2 mins. 4.2 min. and $\sim$ 20 mins. half-life have been found in uranium fission. The activity of $\sim$ 20 mins. half-life has been shown to be ^{131}Sb. HD. 521. S. O. code no. 70-674-33. AERE C/R 729.

Some notes on the nature of experiments, on the statistics of counting, and on the fitting of exponential decay curves to the results of counting experiments, an A.E.R.E. report, by D. J. Behrens. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1951. 44p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.40. PB 107767

Appendix I: Further discussion of the a priori probability Pnil. Appendix II: Worked examples of methods referred to the text. - Appendix III: Table for the construction of the data sheet described in Section 7. S. O. code no. 70-674-0-15.
1. Probability - Gt. Brit. 2. Statistical theory - Gt. Brit. 3. Curve fitting - Gt. Brit. 4. Atomic power - Research - Gt. Brit. 5. Poisson's ratio - Gt. Brit. 6. Nuclear physics - Gt. Brit. 7. Nuclei - Decay characteristics - Gt. Brit. 8. Radiation counters - Mathematical analysis - Gt. Brit. 9. Gaussian law (Mathematics) - Gt. Brit. 10. AERE T/R 629.

Some preliminary observations on the Raman spectra of uranyl salts, an A.E.R.E. report, by J. Sutton. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1951. 14p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. $.65. PB 107693

HD. 547. S. O. code no. 70-674-0-39.
1. Uranyl salts - Raman spectra - Gt. Brit. 2. Raman spectra - Gt. Brit. 3. Atomic power - Research - Gt. Brit. 4. AERE C/R 769.

Some remarks on application of the spherical harmonics method in the case of complex geometries, an A.E.R.E. report, by B. Davison. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1951. 19p tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.75. PB 107668

A new procedure is given for setting down the spherical harmonics method equations and reducing them to the equations for one unknown at a time, for the cases when the angular distribution depends on both angles characterising the direction of a neutron. This new procedure is noticeably more economical in algebraic manipulation than that given in LT-18[A], and noticeably more elementary than that given in MT-92[A]. The essence of this new procedure is that in the earlier stages of the calculation one works in the Cartesian coordinates, and treats all the harmonics of any particular order in block; the subdividing harmonic of order s into its (2S+1) components and the passage to the system of coordinates appropriate to the particular geometrical arrangement are carried out after the system of equations has been reduced to equations for one unknown at a time. The new procedure is illustrated by applying it to the case of a finite cylinder. H.D. 491. S. O. code no. 70-674-0-25. AERE T/R 700.

Variation of the Klein-Nishina differential cross section with gamma energy, an A.E.R.E. report, by D.W.S. Smout. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1952. 8p graphs Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.40. PB 107790

Curves are given for the Klein-Nishina differential cross section for a range of gamma ray energies. The values are compared with results obtained from a gamma ray scintillation spectrometer. HD 694. S. O. code no. 70-674-0-72. AERE EL/R 892.

PSYCHOLOGY

Certain temporal characteristics of the recall of verbal associates, by W. A. Bousfield, C. H. W. Sedgewick, B. H. Cohen. Connecticut. University, Storrs, Conn. Sep 1952. 12p graph, tables Available from University of Connecticut, Storrs, Conn. PB 107926

Technical report no. 3 under Contract Nonr-631(00). For reports no. 1-2 see PB 107924-107925.
1. Words - Association 2. Psychological tests.

Effects of reinforcement on the occurrence of clustering in the recall of randomly arranged associates, by W. A. Bousfield and B. H. Cohen. Connecticut. University, Storrs, Conn. Sep 1952. 17p graph, tables Available from University of Connecticut, Storrs, Conn. PB 107924

Technical report no. 1 under Contract Nonr-631(00). For reports 2-3 see PB 107925-107926.
1. Words - Association 2. Psychological tests.

Occurrence of clustering in the recall of randomly arranged words of different frequencies-of-usage, by W. A. Bousfield and B. H. Cohen. Connecticut. University, Storrs, Conn. Sep 1952. 15p graph, tables Available from University of Connecticut, Storrs, Conn. PB 107925

Technical report no. 2 under Contract Nonr-631(a). For reports no. 1 and no. 3. see PB 107924, PB 107926.
1. Words - Association 2. Psychological tests.

RUBBER AND RUBBER PRODUCTS

Kinetic studies on the formation of polybutadiene, by W. Graham and C. A. Winkler. McGill University. Dept. of Chemistry. Feb 1948. 26p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 108015

Kinetic studies on the formation of polybutadiene "popcorn" show that its growth rate is essentially the same in butadiene liquid and vapour, is proportional to the initial weight of seed used, and increases with increased active oxygen content of the seed and with increased temperature. Air, traces of nitric oxide, and large amounts of benzoyl peroxide and of iodine inhibit the growth of popcorn seed. Popcorn formation is initiated in butadiene by benzoyl peroxide; the rate of initiation is accelerated by rusty iron and water and is a function of benzoyl peroxide concentration and temperature. Studies of gel formation in liquid butadiene containing benzol peroxide indicate that polymerization proceeds by a free radical mechanism, the rate being proportional to the square root of the benzol peroxide concentration. Further details on polybutadiene growth and reaction rates are included. Technical report to Reconstruction Finance Corporation, Office of Rubber Reserve, Research and Development Section, Polymer Research Branch.

STRUCTURAL ENGINEERING

Design of buildings for grass drying plants. Gt. Brit. Ministry of Agriculture and Fisheries. Agricultural Land Service. Jul 1950. 14p drawings Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.10. PB 107906

Fixed equipment of the farm leaflet no. 4.
1. Grasses - Drying - Gt. Brit. 2. Farms - Buildings - Design - Gt. Brit.

Transmission of shock waves in thinwalled cylindrical tubes, by Frithiof I. N. Niordson. Sweden. Kungl. Tekniska Hogskolan, Stockholm. 1952. 24p graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107947

The ordinary jump conditions of a shock front are modified so as to take into account the consumption of energy in the walls of the cylindrical tube, in which the shock wave is transmitted. It is found that a shock wave cannot travel above and arbitrarily close to a certain critical velocity where the deformation of the tube becomes considerable. Acta polytechnica 107, Physics and applied mathematics series vol. 2, no. 1. Also published as Kungliga Tekniska Högskolans Handlingar nr. 57.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Application of planing characteristics to the calculation of the water landing loads and motions of seaplanes of arbitrary constant cross section, by Robert F. Smiley. U. S. National Advisory Committee for Aeronautics. Nov 1952. 37p diagrs, graphs, table Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107846

1. Hydrodynamics - Theory 2. Seaplanes - Hulls - Length-beam ratio 3. Seaplanes - Hulls - Planing surfaces 4. Seaplanes - Landing shock 5. Loads, Landing - Impact 6. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 7. NACA TN 2814.

Comparative examination of some measurements of airfoil section lift and drag at supercritical speeds, by Gerald E. Nitzberg and Stewart M. Crandall. U. S. National Advisory Committee for Aeronautics. Nov 1952. 30p Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107957

1. Airfoils - Drag 2. Airfoils - Lift coefficient 3. Flow, Subsonic 4. Mach number - Effect 5. U. S. Ames Aeronautical Laboratory, Moffett Field, Calif. 6. NACA TN 2825.

Effect of high-lift devices on the static-lateral-stability derivatives of a 45° sweptback wing of aspect ratio 4.0 and taper ratio 0.6 in combination with a body, by Jacob H. Lichtenstein and James L. Williams. U. S. National Advisory Committee

for Aeronautics. Nov 1952. 50p photos, graphs, diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107956

1. Wings, Sweptback - Drag 2. Wings, Sweptback - Lift distribution 3. Wings, Sweptback - Stability 4. Flaps, Aircraft - Trailing edges 5. Lift coefficient 6. Stability, Directional - Static tests 7. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 8. NACA TN 2819.

Effects of dynamic lateral stability and control of large artificial variations in the rotary stability derivatives, by Robert O. Schade and James L. Hassell, Jr. U. S. National Advisory Committee for Aeronautics. Oct 1952. 57p photo, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107800

1. Stability, Lateral 2. Damping derivatives - Stability 3. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 4. NACA TN 2781.

Kyokaiso no sen' i o okuraseru yokugata no tuite (On the design of airfoils in which the transition of the boundary layer is delayed), by Itiro Tani. Oct 1952. 74p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107824

Translated from Aeronautical Research Institute, Tokyo Imperial Univ., Rept. 250, v. 19, no. 1, Jan 1943.
1. Airfoils, Symmetrical - Design - Japan 2. Flow, Laminar - Theory - Japan 3. Boundary layer - Transition point - Japan 4. Reynolds number - Effect - Japan 5. U. S. National Advisory Committee for Aeronautics 6. NACA TM 1351.

Lifting trapezoidal wing with small aspect ratio at supersonic speed, by Herman Behrbohm. Svenska Aeroplan Aktiebolaget, Linköping, Sweden. Apr 1952. 37p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107758

1. Flow, Supersonic - Sweden 2. Wings, Trapezoidal - Lift - Sweden 3. Wings, Trapezoidal - Aspect ratio - Sweden 4. Wings, Trapezoidal - Pressure distribution - Sweden 5. SAAB TN 10.

Numerical integration method for calculating the pressure distribution at supersonic speeds for wings with subsonic leading edge at symmetrical flow conditions, by V. V. Linnaluoto. Svenska Aeroplan Aktiebolaget, Linköping, Sweden. 1952. 19p diagrs, graphs, tables Available from Library of Congress, Publication Board, Washington 25, D. C. Microfilm $1.75, Photostat $2.50. PB 107756

By deciding the integration region into a net of small equal areas having sides parallel to the Mach-lines, one arrives at a numerical integration method that can be adapted to arbitrary wings. The integration can be performed with a standard calculating machine. The elements of area at the wing's leading edge are calculated by means of special expressions that can be tabulated or presented in graphical form. SAAB TN 6.

On the calculation of flow about objects traveling at high supersonic speeds, by A. J. Eggers, Jr. U. S. National Advisory Committee for Aeronautics. Oct 1952. 25p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107823

1. Flow, Supersonic - Calculations 2. Flow, Three dimensional - Theory 3. U. S. Ames Aeronautical Laboratory, Moffett Field, Calif. 4. NACA TN 2811.

Simple graphical solution of heat transfer and evaporation from surface heated to prevent icing, by Vernon H. Gray. U. S. National Advisory Committee for Aeronautics. Oct 1952. 21p graphs (part fold) Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107801

1. Heat - Transference - Aerodynamics 2. Ice prevention 3. Evaporation - Rate 4. Mathematical equations and solutions 5. U. S. Lewis Flight Propulsion Laboratory, Cleveland, O. 6. NACA TN 2799.

Theory and procedure for determining loads and motions in chine-immersed hydrodynamic impacts of prismatic bodies, by Emanuel Schnitzer. U. S. National Advisory Committee for Aeronautics. Nov 1952. 51p diagrs, graphs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107954

1. Hydrodynamics - Theory 2. Seaplanes - Hulls - Dead rise 3. Seaplanes - Hulls - Length-beam ratio 4. Loads, Landing - Impact 5. Hydrofoils 6. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 7. NACA TN 2813.

Überblick über die entwicklung und forschung auf den gebiete der drehflügelflugzeuge (Survey on German research and development of rotary wing aircraft) Editor: G. J. Sissingh. Aerodynamische Versuchsanstalt, Göttingen, Ger. Jul 1948. 145f drawings, table (Text in German and English) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $5.75, Enlargement Print $20.00. PB 107940

A survey on German research and development of rotary-wing aircraft is presented. The following types of rotary-wing aircraft are considered; the autogiro, the helicopter, and the gyrodyne. Attachment of the blades, design and construction of the blades, and treatment and testing of the spar tubes are discussed. A detailed description of the types developed and planned such as the helicopters Fw 61, Fa 223, Fa 284, Fl 185, Fl 265, Fl 282, and Fl 339, the gyroplane glider Fa 230, the gyroplane towing aircraft Fa 330 " Bachstelze," a jet-propelled helicopter, and the apparatus (unmanned) known as the

AEG helicopter are included. AVA Monographs, series N. Translated by Gt. Brit. Ministry of Aircraft Production. Contents: 1. Introduction. - 2. Design of the rotors, by G. J. Sissingh 3. Description of the types developed and planned, by O. H. Nagel. Micro RTP/T 1020. Micro GDC 3501T.

Water-pressure distribution during landings of a prismatic model having an angle of dead rise of 22-1/2° and beam-loading coefficients of 0.48 and 0.97, by Robert F. Smiley. U. S. National Advisory Committee for Aeronautics. Nov 1952. 37p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107955

1. Hydrodynamics - Theory 2. Loads, Landing - Impact 3. Seaplanes - Hulls - Dead rise 4. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 5. NACA TN 2816.

Engines and Propellers

Comparison of two- and three-dimensional potential-flow solutions in a rotating impeller passage, by Gaylord O. Ellis and John D. Stanitz. U. S. National Advisory Committee for Aeronautics. Oct 1952. 60p diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington, D. C. PB 107802

1. Flow, Two dimensional 2. Flow, Three dimensional 3. Compressors - Flow 4. Impellers, Rotating 5. U. S. Lewis Flight Propulsion Laboratory, Cleveland, O. 6. NACA TN 2806.

Investigation of the effect of the length/diameter ratio of a small-scale combustion chamber on weak flame stability limits, by F. G. Kitson. Canada. National Aeronautical Establishment. Aug 1952. 10p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. Limited supply available for exchange from National Aeronautical Establishment, Montreal Road, Ottawa, Canada. PB 107891

The scale effect on weak stability limits was studied using propane as fuel in a small-scale combustion apparatus. The stability of the chambers was tested by determining air/fuel ratio limits at which extinction occurs as a function of total air flow (at constant pressure). In this preliminary investigation it was found that in two out of the three chamber diameters studied, the weak stability limits were extended by the greatest amounts when the length/diameter ratio of the combustion chamber was approximately 7:1. NAEC LR34.

Aerodynamics

Investigation of a diffraction-grating interferometer for use in aerodynamic research, by James R. Sterett and John R. Erwin. U. S. National Advisory Committee for Aeronautics. Nov 1952. 36p photos, diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107959

1. Interferometers, Optical 2. Aerodynamics - Research - Equipment 3. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 4. NACA TN 2827.

Investigation with an interferometer of the flow around a circular-arc airfoil at Mach numbers between 0.6 and 0.9, by George P. Wood and Paul B. Gooderum. U. S. National Advisory Committee for Aeronautics. Oct 1952. 80p photos, diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107711

1. Boundary layer - Interactions 2. Flow, Laminar 3. Flow, Turbulent 4. Mach number - Effects 5. Interferometers 6. Airfoils - Wind tunnel tests 7. Airfoils - Pressure distribution 8. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 9. NACA TN 2801.

Second approximation to laminar compressible boundary layer on flat plate in slip flow, by Stephen H. Maslen. U. S. National Advisory Committee for Aeronautics. Nov 1952. 38p graphs, table Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107862

1. Boundary layer, Laminar - Flow 2. Boundary layer, Laminar - Temperature distribution 3. Boundary layer, Laminar - Compressibility 4. Boundary layer - Interactions 5. Flow, Subsonic 6. Flow, Supersonic 7. U. S. Lewis Flight Propulsion Laboratory, Cleveland, O. 8. NACA TN 2818.

Study of the transient behavior of shock waves in transonic channel flows, by Robert V. Hess. U. S. National Advisory Committee for Aeronautics. Oct 1952. 32p diagrs Available from National Advisory Committee for Aeronautics, 1724 "F" St., N. W., Washington 25, D. C. PB 107687

1. Shock waves - Computation 2. Diffusers, Supersonic - Flow patterns 3. U. S. Langley Aeronautical Laboratory, Langley Field, Va. 4. NACA TN 2797.

Tables of Multhopp and other functions for use in lifting-line and lifting-plane theory, by V. M. Falkner, with appendix by E. J. Watson. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Feb 1948. 52p diagrs, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $3.15. PB 107486

The report gives the derivation and computed tables of two classes of functions suitable for the solution of problems of spanwise aerodynamic loading of wings either by lifting-line or lifting-plane theory. The functions are based on lifting-line theory, but, by a consideration of the connection between lifting-line lifting-plane theory through the application of

Munk's stagger theorem to the calculation of induced drag, it is deduced that the functions must be equally suitable for lifting-plane theory. The first range of functions, called Multhopp or M functions, is associated with discontinuities of induced downwash, while the second, called P functions because of the polygonal representation of induced downwash, is connected with discontinuities in rate of change of induced downwash. Examples are given of the combination of functions to produce given curves of induced downwash, and evidence of the close relation between the results for a continuous and stepped downwash curve suggests that the functions tabulated will be sufficient to cover almost any problem in wing loading. Cover date is 1952. S. O. code no. 33-2593. Contents: Appendix: Calculation of the circulation from the downwash, by E. J. Watson. ARC RM 2593.

Two-dimensional compressible flow past a solid body symmetrically placed in a channel, by P. V. Abdurahiman. Gt. Brit. Ministry of Supply. Aeronautical Research Council. Oct 1947. 6p diagr, table Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.45. PB 107544

Cover date is 1952. S. O. code no. 23-2443.
1. Flow, Two-dimensional - Theory - Gt. Brit. 2. Mathematics, Applied - Aerodynamics - Gt. Brit. 3. Wind tunnel tests - Gt. Brit. 4. Flow, Compressible - Theory - Gt. Brit. 5. ARC RM 2443.

Marine Transportation

Enige gegevens voor het ontwerpen van scheepsvormen voor: A-Zeegande vracht-enpassagiersschepen; B-Kustvaartuigen (Some data on the design of ship forms for: (a) Seagoing freighters and passenger vessels; (b) Coast-wise vessels), by J.K.D. Van der Klis and J. Kamps. Translated by F. Rizzo. Jun 1952. 10p diagrs, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $1.25, Photostat $1.25. PB 107454

Publication no. 73 of the Netherland Ship-model testing station at Wageningen. Translated from Ships and shipyards, no. 24, 26 Nov 1949.
1. Ships - Design - Netherlands 2. Netherlands. Scheepsbouwkundig Proefstation 3. NAVSHIPS T487.

Ricerche sperimentali sulla cavitazione delle eliche navali (Experimental research on the cavitation of naval propellers), by Emilio Castagneto. Translated by F. Rizzo. Feb 1952. 23p photos, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.00, Photostat $3.75. PB 107450

From La Marine Italiana, vol. 49, Sep 1951, p. 238.
1. Propellers, Marine - Cavitation - Italy 2. Model basin tests - Italy 3. NAVSHIPS T453.

Toepassing van optische methoden bij het afschrijen van platen en profielen in de scheepsbouw (OPTAF) (Application of optical methods in the marking-off of plates and profiles in shipbuilding (OPTAF), by J. H. Krietemeyer. Translated by Bart Landheer. Mar 1952. 34p photos, drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm $2.25, Photostat $5.00. PB 107453

Lecture given for the Society of Marine Engineers, section "Rotterdam", Oct 26, 1951. Translated from Schip en werf, vol. 18, no. 24, 23 Nov 1951, p. 466-469.
1. Shipbuilding - Netherlands 2. Ships - Design - Netherlands 3. OPTAF (Optical marking-off method) 4. NAVSHIPS T456 5. STS 129.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Guide to source material on water pollution control. U. S. Public Health Service. Division of Water Pollution Control. May 1950. 25p Available from U.S. Public Health Service, Division of Water Pollution Control, Washington 25, D. C. PB 107513

1. Water - Pollution - Bibliography.

Microkjeldahl procedure in water and sewage analysis, by George W. Reid. 1952. 5p photos, drawing, graph, tables Available from Georgia Institute of Technology, State Engineering Experiment Station, Atlanta, Ga. $.25. PB 107446

Reprint no. 57. Vol. XIV, No. 2, May 1952. Reprinted from Water and Sewage Works, March 1952.
1. Sewage - Analysis 2. Water - Analysis 3. Kjeldahl method (Water analysis) 4. G EES R 57.

Report of the Water Pollution Research Board with the report of the Director of Water Pollution Research for the year 1951. Gt. Brit. Dept. of Scientific and Industrial Research. Water Pollution Research Board. Feb 1952. 66p photos, fold map, graphs, tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $.65. PB 107909

S. O. code no. 47-72-0-51.
1. Water - Pollution - Gt. Brit. 2. Sewage - Purification - Gt. Brit. 3. Trade waste - Purification - Gt. Brit.

MISCELLANEOUS

Final report of the Council. Anglo-American Council on Productivity. Sep 1952. 45p Available from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $.90. PB 106461

1. Production control 2. Industrial management.